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ABSTRACT

The study described attempted to determine the relationship of racial integration to reading achievement of black and white elementary students during 1973-1974, the first year of wide scale racial integration of Alexandria elementary schools. The research hypothesis was that the difference between reading achievement means of black and white students measured before integration would be equal to the difference between reading achievement means of these same students measured after integration in the absence of an effect, and unequal in the presence of an effect. An analysis of variance of the gain scores showed that the difference between black and white achievement had widened after integration, with blacks falling farther behind whites in comparison to the difference in reading before integration. An analysis of covariance at all three grade levels failed to show that race was not a significant factor in achievement differences after integration when initial black/white achievement differences in reading were controlled statistically. On the basis of these findings and of those of other studies reviewed, it is recommended that no further plans to alter the racial composition of Alexandria elementary schools be implemented unless and until it can be determined that such changes have a positive relationship to achievement. (Author/MC)

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A Study of the Relationship of Racial Integration to Reading Achievement in Grades Two, Three, and Five in Alexandria, Virginia, City Public Schools

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The Faculty of

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CHAPTER I

INTRODUCTION

The primary purpose of this study was to determine the relationship, if any, of racial integration to reading achievement of black and white elementary students in grades two, three, and five in Alexandria, Virginia, City Public Schools which were formerly segregated on a de facto basis.

In order to accomplish this purpose several obstacles had to be overcome:

1. An understanding of previous studies on the effects of racial integration upon black and white achievement in reading required a review of many of the factors that have been identified as having influenced achievement. This could be conceptualized as finding out what factors might make a difference in achievement in the aggregate.

2. In order to understand the factorial analysis used in these studies and be able to formulate a workable research design for the present study at least a rudimentary knowledge of statistical research methods had to be gained.

3. Much of the literature on racial integration and achievement has been difficult to read, inconclusive in terms of identifying factors that might influence achievement, and often misleading.

Some of the by-products of research on racial composition

of schools as a factor in achievement, and particularly the relative weight that school and socioeconomic level factors have in accounting for differences in achievement among racial and ethnic groups, have somewhat changed many traditional ideas about how much of the variance in achievement between schools can be accounted for by differences in school factors such as curriculum, physical facilities, and per pupil expenditures. Whether or not one accepts the idea that the school factors as measured by such items are not as important in terms of explaining variance in achievement as once was believed, their value as indices of educational quality has come into question.

In a very real sense the study described in this dissertation has dealt as much with what we do not know about the relationship between racial integration and reading achievement as it has with what we think we know. It is important to know what we as educators do not know in order to base our policies on facts rather than popular myths. We must know what we have done in the past and what we are doing now in the schools in order to plan for a future that will insure equality of educational opportunity for all who attend American public schools.

The Problem

What was the relationship, if any, of racial integration to reading achievement of black and white elementary students in grades two, three, and five of Alexandria, Virginia, City Public Schools during 1973-1974, the first year of racial integration of elementary schools in Alexandria on a wide scale by busing and pairing? A comparison was made in this study between

the reading achievement of a randomly selected sample of black and white students in grades one, two, and four in thirteen out of fifteen elementary schools in Alexandria whose racial compositions were significantly different than the November 30, 1972, racial composition of 64 percent white, 34 percent black, and 3 percent other and these same students one year later in grades two, three, and five in schools with an average racial composition as of November 30, 1973, of 55 percent white, 40 percent black, and 5 percent other.

The integration of elementary schools in Alexandria, Virginia, on a wide scale in 1973, was achieved in three ways:[1]

1. Predominantly black and predominantly white schools were paired with one school becoming a primary school (grades 1, 2, 3) and the other an intermediate school (grades 4, 5, 6). Kindergartens were retained as neighborhood school populations in both primary and intermediate schools. Students from each formerly de facto segregated attendance area were transported by bus to either the newly organized and now integrated primary or intermediate schools.

2. Some predominantly white schools retained their K-6 curriculum pattern but gained enough Negro students through busing to approach the system racial composition of 40 percent black. These schools received black students from one large, predominantly black school which was also paired with a large,

[1]For a complete description see Mark Howard, "An Historical Study of the Desegregation of the Alexandria, Virginia, City Public Schools, 1954-1973" (Doctoral dissertation, The George Washington University, 1976).

predominantly white school. Even after this pairing there were enough black students from this large, black school to help balance three predominantly white schools.

3. One small, predominantly black school was eliminated entirely and its students bused to a pair of predominantly white schools of which one already had a 38 percent black racial composition.

4. Another small, predominantly black school was paired with a small, predominantly white school which became its paired primary school for grades one, two, three, and four.

5. Only one elementary school with a large student body and a racial composition of 66 percent white, 30 percent black, and 4 percent other was not affected by the 1973 plan for integration of Alexandria's elementary schools by busing. This school, Mt. Vernon, and another school, Stonewall Jackson, that had absorbed the eliminated predominantly black school, Theodore Ficklin, were not sampled in this study, since they were already substantially integrated prior to the 1973 plan for reorganization of Alexandria elementary schools for the purpose of achieving racial balance.

Purposes of the Study

The study described in this dissertation had the following purposes:

1. To determine the relationship between racial integration of the elementary schools in Alexandria, Virginia, City Public schools and the reading achievement of black and white students in a sample of grades two, three, and five.

2. To provide a description of black and white reading achievement subpopulations in Alexandria elementary schools in grades two, three, and five before and after integration

Research Hypothesis

The research question to be answered in this study was whether or not there was a relationship between racial integration and the reading achievement of black and white elementary students in grades two, three, and five in Alexandria, Virginia, City Public Schools during 1973-1974, the first year of de facto integration of its elementary schools through pairing and busing. In order to determine the presence or absence of an effect of racial integration on the reading achievement of black and white elementary students during this period, it was hypothesized that the difference between the means of reading achievement for black and white elementary students in the sample measured before integration would be equal, in the absence of an effect, and unequal, in the presence of an effect, to the difference between the means of the reading achievement of these same students after integration.

Limitations of the Study

1. No attempt has been made to show a causal relationship between racial integration and reading achievement.

2. Findings were limited to elementary students in Alexandria, Virginia, City Public Schools.

3. No attempt has been made to consider affective behavioral outcomes of integration in Alexandria elementary schools.

Procedures

The procedures used in this study were developed in the

following order:

1. Identification of the basic research question
2. Development of a research hypothesis
3. Development of a factorial research design
4. Development of statistical hypotheses to test the research hypothesis
5. Selection of a level of statistical significance to be used in the study
6. Selection of a measure of achievement for reading
7. Development of a sampling procedure
8. Collection of data
9. Treatment of data
10. Interpretation of findings
11. Conclusions
12. Recommendations for further study

Definition of Terms

The following definitions have been developed for use in the present study:

black - a person of Afro-American descent

de facto - existing in fact whether by force, legal right or otherwise

de jure - existing on the basis of law or legal right

desegregation - a condition under which there is no discrimination on the basis of race

integration - a condition under which there is no discrimination on the basis of race

Negro - a person of Afro-American descent used in this

study throughout the review of literature for the sake of being consistent but not elsewhere

segregation - a condition in which there is discrimination on the basis of race

Need and Significance

This study has provided an opportunity to further examine, on a limited scale, in a quasi-experimental research design that has actually been implemented by a school system, the findings of James S. Coleman et al. in Equality of Educational Opportunity that ". . . as the proportion white in a school increases, the achievement of students in each racial group increases."[1]

Mosteller and Moynihan have interpreted this finding to mean, "Racial integration where minority group students were not a majority seemingly improved the level of achievement for them without lowering it for others. But the improvement was not great."[2]

Coleman did not measure achievement of whites and blacks as antecedent variables before integration and then compare this with achievement after integration. His survey was done at a single point in time and represented a cross-sectional rather than a longitudinal experimental approach. In the present study

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[1] U.S., Department of Health, Education, and Welfare, Office of Education, Equality of Educational Opportunity, 2 vols., by James S. Coleman et al. (Washington, D.C.: Government Printing Office, 1966), 1:307.

[2] Frederick Mosteller and Daniel P. Moynihan, eds., On Equality of Educational Opportunity: Papers Deriving from the Harvard University Faculty Seminar on the Coleman Report (New York: Random House, 1972), p. 24.

a before and after measure was used to bring the focus of the study on the change in achievement that might be attributed to a relationship between integration and achievement in reading rather than the level of achievement.

The study was significant in the following ways:

1. It provided an opportunity to test findings of previously reported studies on the effects of racial integration on reading achievement in an actual school situation.

2. It related research design to findings and conclusions in reviewing the literature on previous studies of the effects of racial integration on achievement in reading.

3. It used a standardized test measure that was not subject to the limitations of the grade level equivalent.

4. It provided an illustration of how a relatively simple research design carefully planned and executed can help examine complex educational factors such as race and achievement.

The study should prove useful to students of education, teachers, administrators, school board members, attorneys, judges, researchers, and professors of education in the following ways:

1. Illustrates the necessity of testing hypotheses in actual school situations before making policies.

2. Shows the need for partitioning black and white test scores to provide basic research data.

3. Provides a simple, longitudinal research design that avoids the complicated socioeconomic class factors by using the same students for before and after measures.

4. Provides a selective yet fairly comprehensive review of the literature on race and integration as achievement factors.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Since the 1954 Supreme Court decision declared de jure segregation of students by race in the public schools unconstitutional, and therefore illegal, much has been written on the subjects of racial segregation, desegregation, and integration. Although de jure segregation by race in the public schools had been declared illegal, by 1966, nevertheless, most students in the United States attended public schools that were segregated.[1] This de facto racial segregation in the public schools has led to subsequent court decisions that declared de facto racial segregation in the public schools illegal and often remedied this condition through court-ordered busing for the purpose of racial desegregation.

The research studies that were reviewed were limited to those that dealt with the relationship between student achievement as measured by standardized tests and the racial composition of the student body. In general, studies of this relationship in elementary schools were reviewed, although some secondary school studies have been included because of the paucity of empirical studies of this subject.

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[1]Coleman, Equality of Educational Opportunity, 1:3.

Nancy H. St. John in Minority Group Performance Under Various Conditions of School Ethnic and Economic Integration: A Review of Research provided an efficient classification method for reviewing research studies on the relationship of racial composition of student body to student achievement which categorized such studies according to research design used and separated cross-sectional studies into Pre-Coleman and Post-Coleman divisions, since she considered Coleman's 1966 study, Equality of Educational Opportunity, as the landmark study in this area.[1]

St. John described an optimal research design to establish a causal relationship between student body racial composition and achievement in which students were randomly assigned to experimental and control groups. This research design had four cells: (1) experimental group, time one, segregated or non-segregated; (2) experimental group, time two, desegregated or non-segregated; (3) control group, time one, segregated; (4) control group, time two, segregated. Both experimental and control groups would be tested before and after the experimental treatment--desegregation. A greater change in the experimental group at time two could be attributed to desegregation, if other variables were controlled.[2]

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[1]U.S., Department of Health, Education, and Welfare, Office of Education, Minority Group Performance Under Various Conditions of School Ethnic and Economic Integration: A Review of Research, by Nancy H. St. John, Office of Education Contract No. 6-10-240 (Bethesda, Md.: ERIC Micro Form Systems, ED 021 945, 1969), pp. 1-16.

[2]Ibid., pp. 13-14.

As St. John has also observed, the ideal four-celled research model with random assignment of students to control and experimental groups has seldom been possible for ethical and political reasons. To overcome this difficulty quasi-experimental designs which control some variables statistically have been used. The classification method described by St. John in which four categories of research designs were identified was adapted for the present review of literature to provide a selective, analytical, framework in which previous research studies to determine the relationship between racial composition of student body and achievement could be evaluated. These four categories of research designs are:

1. One-Celled Studies
2. Longitudinal Studies with No Control Group
3. Cross-Sectional Studies without Pre-Treatment Measurement
4. Four-Celled Studies with Control Group[1]

One-Celled Studies

One-celled studies were those that examined the achievement of Negro students under conditions of racial segregation or non-segregation, but not both. Most studies in this category were designed to determine Negro-white achievement differences and were not directly related to racial integration and achievement except as an indictment of separate schools for Negroes and whites. The findings of these studies showed that Negro

[1]Ibid., pp. 13-16.

achievement in Southern and Northern elementary schools was from 1.6 to 3.4 years below grade level, and that this achievement deficiency increased with each year in school. Achievement of Negro students was found lowest in segregated, Southern schools and highest in integrated, Northern schools.[1]

Longitudinal Studies with No Control Group

Longitudinal, two-celled studies of the relationship between racial composition of student body and achievement used a pretest to measure achievement of white and Negro students before racial integration of the student body and a posttest to measure the achievement of the same white and Negro students after racial integration. The difference between these achievement measures could be attributed to the treatment or experimental effect of changing the composition of the student body by racial integration. On the other hand, without a control group of students like the experimental group in all respects except that they remained racially segregated, an effect on achievement due to racial integration might also be attributed to maturation, outside community events, the influence of previous testing, a change in the quality of schooling such as lower teacher-pupil ratios, improved instruction, and compensatory programs in addition to the temporary effect of being bused to a new school in a different neighborhood.[2]

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[1]Ibid., pp. 16-23. [2]Ibid., pp. 4, 15.

Stallings performed one of the early studies of this type in which he compared the achievement of white and Negro students as measured by standardized achievement tests in grades two, six, and eight before and after integration of the Louisville, Kentucky, city public schools during 1955 and 1956. He theorized two ways racial integration might affect white and Negro achievement: (1) change in learning opportunities for either or both races and (2) changes in degree of motivation for both races. Stallings speculated that Negro students with new legal status of equality might be motivated to meet the challenge of competition with white students, while white students, on the other hand, might be motivated to perform even better to prove their supposed superiority. Before comparing standardized test results for white and Negro students prior to and after integration he checked the following factors to see if they had changed during the period studied: (1) chronological age of students, (2) mental age of students, (3) socioeconomic status of students, (4) school attendance, (5) school success as measured by grade progress, (6) class size, (7) teaching personnel, and (8) instruments of evaluation. For some unexplained reason Stallings accounted for no change in any of these except teaching personnel which he did not mention at all except to list as a factor.[1]

---

[1]Frank H. Stalling, "A Study of the Immediate Effects of Integration on Scholastic Achievement in the Louisville Public Schools," Journal of Negro Education 28 (Fall 1959):440-41.

Stallings attempted to answer the following research questions in his study:

> (1) Was there a significant change in the achievement level of white pupils with the advent of integration?
> (2) Was there a significant change in the achievement level of Negro pupils?
> (3) Can these changes, if present, be shown to relate to a change in motivation experiences by pupils and teachers as a result of integration?[1]

As Table 1 shows, Stallings compared the achievement scores of white and Negro students before and after integration at grades two, six, and eight. Test scores were analyzed in terms of standard error of difference between means and *t* values converted into levels of significance at .01 and .05.

TABLE 1.--Mean Achievement Gains for White and Negro Students in Stallings' 1955-1956 Study of the Effects of Racial Integration on Achievement

Grade	Race	Sample Size		Mean Gain
		Pre-Test	Post-Test	
Two	White	3,605	3,402	1.2 months
	Negro	1,330	1,343	3.0 months
Six	White	2,631	2,229	0.9 months
	Negro	809	661	5.0 months
Eight	White	2,626	2,140	2.0 months
	Negro	703	683	4.0 months

SOURCE: Frank H. Stallings, "A Study of the Immediate Effects of Integration on Scholastic Achievement in the Louisville Public Schools," Journal of Negro Education 28 (Fall 1959):442-43.

[1] Ibid., 28:442.

Stallingsreached the following conclusions as the result of his study:

1. Neither white nor Negro achievement declined as the result of integration. Both groups gained with Negroes gaining most.

2. Interviews with students and teachers indicated that integration produced greater motivation to achieve for Negroes and to a lesser extent for whites.

3. Integration does not have an adverse effect on white achievement and may improve Negro achievement.[1]

Stallings' study was done with a relatively large sample using a longitudinal design; however, there are some questions about his conclusions. As Katz has pointed out, Stallings did not indicate that achievement gains for Negroes were related to the racial composition of the student body, but did note that achievement gains were greater for Negro students who chose to remain with Negro teachers. Katz also stated that the classes where Stallings observed greatest gains for Negroes with Negro teachers were actually segregated, and the Negro gains must have been due to factors other than integration.[2]

Another difficulty with Stallings' study is that three different achievement tests were used so that the grade level norms may not have the same values for each grade level. Weinberg pointed out an even more serious limitation of Stallings' study.

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[1] Ibid., 28:439.

[2] Irwin Katz, "Review of Evidence Relating to Effects of Desegregation on the Intellectual Performance of Negroes," American Psychologist 19 (June 1964):381-399.

Stallings used average scores rather than individual scores and thus effectively obscured any effect that could be attributed to a relationship between achievement and integration.[1] As Table 1 shows, average scores would also have been affected by the considerable differences between the sample sizes for the pretest and posttest with a loss of 1,091 white students and 205 Negro students.

Another longitudinal study on the effects of racial integration on achievement that is often cited in reviews of literature on this subject was done by Carl F. Hansen, former Superintendent of Schools of the District of Columbia. Hansen, while disclaiming any intent to present a carefully planned research design to show a relationship between integration and achievement, investigated the following hypotheses:

1. After integration of the public schools in the District of Columbia both white and Negro students had better educational facilities and opportunities than those prior to integration.

2. Negro students performed academically somewhat better in the five years after integration than they had during a similar period prior to integration.

---

[1]Meyer Weinberg, Desegregation Research: An Appraisal, 2d ed. (Bloomington, Ind.: Phi Delta Kappa, 1970; Bethesda, Md.: ERIC Micro Form Systems, ED 044 392, 1970), pp. 47-48.

3. White students performed at least as well during the five years after integration of the District of Columbia public schools in 1955 as they had during a similar period prior to integration.[1]

Hansen defended his first hypothesis by showing that inequities in per pupil expenditures for white and Negro students and the greater student-teacher ratio for Negroes with accompanying overcrowding of facilities were eliminated after integration. Hansen also felt he had provided greater equality of educational opportunity for white and Negro students through implementation of an academic track system which allowed white and Negro students to progress at their individual rates of learning.[2]

In order to support his second hypothesis that Negro students performed better after integration and his third hypothesis that white students performed at least as well as both groups had done in a similar period prior to integration Hansen presented system-wide, average, standardized test results for the academic years 1955 through 1959. The average scores had not declined; however, as St. John has pointed out Hansen's findings are severely limited by the following:

1. There was no system-wide standardized testing for Negro students in the District of Columbia prior to integration.

2. White and Negro test scores were not partitioned; therefore, improved white scores could have accounted for much of the system-wide average scores.

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[1]Carl F. Hansen, "The Scholastic Performance of Negro and White Pupils in the Integrated Public Schools of the District of Columbia," Harvard Educational Review 30 (Summer 1960):216-36.

[2]Ibid.

3. Scores of the same students were not traced. Instead scores of successive, intact classes were compared.

4. Actual racial composition of schools and classrooms was not considered. Since the system was already very much a majority-Negro system, many students did not actually experience integration.

5. The academic track system implemented at the same time as integration probably segregated many classrooms even in schools that were integrated.

6. Increasing per pupil expenditures for Negro students and lowering the teacher-student ratio for Negroes might well have affected achievement.[1]

Katz also noted that the academic gains reported by Hansen in his study could be attributed to changes in the school program other than integration and that the increasing percentage of Negroes in the District of Columbia public schools as well as Hansen's track system which concentrated Negroes in the lower tracks produced a minimal integrated school experience for Negro students in the District.[2] Weinberg, on the other hand, appeared to accept Hansen's findings that Negro students performed better after integration while white students performed at least as well as both groups had prior to integration without qualification in spite of the serious flaws in Hansen's research.[3]

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[1] St. John, Minority Group Performance, pp. 24-25.

[2] Katz, "Review of Evidence Relating to Effects of Desegregation on Intellectual Performance of Negroes," pp. 381-99.

[3] Weinberg, Desegregation Research, pp. 42-43.

Graves and Bedell studied achievement and desegregation in a plan implemented in White Plains, New York, in 1964, with the goal of achieving at least ten to thirty percent Negro students in each elementary school. Five formerly white, segregated grade schools were racially balanced, while one predominantly Negro school was closed. Two groups of white students which had attended the same elementary school-- 150 before and 129 after desegregation--were compared. White students who attended the school after desegregation showed no significant change in median test scores compared with the group that had attended the school as an all-white, segregated school.[1]

The test scores of thirty-six Negro students who had attended a segregated elementary school were compared by Graves and Bedell with those of thirty-three Negro students who lived in the same area but had attended racially balanced schools after the predominantly Negro elementary school was closed. Those Negro students who attended racially balanced schools made greater gains in paragraph meaning and arithmetic reasoning, while those who had attended the segregated school made greater gains in arithmetic computation.[2]

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[1]Marian F. Graves and Frederick D. Bedell, A Three Year Evaluation of the White Plains Racial Balance Plan (White Plains, N.Y.: Board of Education, 1967), cited by Meyer Weinberg, Desegregation Research, pp. 68-69.

[2]Ibid.

It was also reported in the Graves and Bedell study that during two years of attendance at racially balanced schools a larger percentage of students made as much as one and a half years growth--85 percent as compared with only 67 percent in segregated schools.[1]

Weinberg concluded that, based on changes in median test scores, desegregation in the White Plains schools had not interfered with the usually high academic achievement level of white elementary students. Weinberg did observe several weaknesses in this study. First of all, no tests of statistical significance were presented. Secondly, the "predominantly Negro" elementary that was closed was only 61.7 percent Negro and was thus effectively integrated when the desegregation plan was implemented. This, of course, invalidates the comparisons made by Graves and Bedell in which they have used this school as a segregated control group.[2]

Denmark, Guttentag, and Riley studied the achievement of eighty-seven lower-class, Negro elementary students transferred from a practically all-Negro school that was being closed to two predominantly white, upper-middle-class schools. Negroes in grades three to five in the first year of integration increased their rate of achievement in verbal ability.[3]

---

[1] Ibid.

[2] Ibid.

[3] Florence L. Denmark, Marcia Guttentag, and Robert Riley, Communication Patterns in Integrated Classrooms and Pre-Integration Subject Variables as They Affect the Academic Achievement and Self-Concept of Previously Segregated Children (Bethesda, Md.: ERIC Micro Form Systems, ED 016 721, 1967), cited by Meyer Weinberg, Desegregation Research, pp. 75-76.

Moorefield found no effects on achievement of white and Negro students due to desegregation by busing in Kansas City, Missouri, in 1967; however, at least twenty percent of the bused students were sent to two schools that already had as high as 65.8 percent Negro enrollments prior to busing. Achievement data were not reported according to school.[1] This study would not be likely to show any effects upon achievement due to desegregation, since some schools actually were resegregated after busing as evidenced by an increase of percent Negro from 65.8 to 99.3.

Cross-Sectional Studies without Pre-Treatment Measurement

Cross-sectional studies without pre-treatment measurement were those that measured a cross-sectional sample of student achievement with no measure of student achievement partitioned by race prior to integration. Unlike longitudinal studies there was no before and after measure but rather a sample of the achievement of white and Negro students at a single point in time.

Pre-Coleman Studies

Gunthorpe, in a 1964 study of Negro and white achievement differences in Copiague, Long Island, New York, where the town's three elementary and one junior high schools were almost perfectly balanced racially, found no significant differences between

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[1] Thomas E. Moorefield, "The Busing of Minority Group Children in a Big City School System" (Doctoral dissertation, University of Chicago, 1967), pp. 145-47, cited by Meyer Weinberg, Desegregation Research, pp. 82-83.

achievement test results for white and Negro students in the seventh and eighth grades, although white students were significantly higher than Negro students in social status and scholastic ability, which Gunthorpe attributed to the practice of academic tracking.[1]

Lesser and his co-authors studied academic achievement in New York City under various conditions of racial balance. The four hundred children who were tested for verbal ability, reasoning, numerical ability, and space conceptualization showed significantly better performance in integrated schools and neighborhoods compared to those which were segregated. Children from these minority groups were more alike in their ability levels, while those from racially imbalanced schools showed very different ability levels for each ethnic group. Lesser did, however, comment that social class factors may have accounted for the fact that children in integrated schools and neighborhoods performed better than those from more segregated ones.[2]

Elliott and Badall in a 1962 study of 4,693 fifth graders in Oakland, California, tried to determine if the racial composition of a school had an effect on achievement

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[1]Muriel B. Gunthorpe, "A Comparison of Negro and White Student Participation in Selected Classes of a Junior High School Program" (Doctoral dissertation, New York University, 1964; Ann Arbor, Mich.: University Microfilms, 64-8477), cited by Meyer Weinberg, Desegregation Research, pp. 53-54.

[2]Gerald S. Lesser et al., "Some Effects of Segregation and Desegregation in the Schools," Integrated Education (June-July, 1964), cited by Meyer Weinberg, Desegregation Research, pp. 52-53.

when scholastic aptitude was controlled. Each student was given an aptitude test and three achievement tests. As the percent Negro in the schools fell mathematics achievement rose; writing achievement rose for two out six of the highest ability levels, while remaining the same for the lower ability levels; and reading achievement seemed completely unaffected by racial composition of the schools. Elliott and Badal concluded that racial composition of the student body was not significantly related to achievement, when scholastic aptitude was controlled. Weinberg viewed Elliott and Badal's study as not making a good case for racial integration and was concerned about the failure of these researchers to relate school atmosphere to achievement changes in specific children.[1] A concern of this writer about this type of study is that even though some initial differences were controlled by the aptitude tests, other differences that have been shown in other studies to affect achievement such as socio-economic background could not be adequately accounted for in this manner. The fact that the study was cross-sectional, rathern than longitudinal, using only a posttest, further added to placing emphasis on levels of achievement rather than changes in achievement.

Matzen's study did take socioeconomic status into account in his 1965 report of the relationship between racial composition of students' classrooms and achievement of eleven hundred elementary students in eleven schools, grades five and seven. Only white

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[1]Merle H. Elliott and Alden W. Badal, "Achievement and Racial Composition of Schools," California Journal of Educational Research (September, 1965), cited by Meyer Weinberg, Desegregation Research, pp. 44-45.

and Negro students were included in this study. Matzen reported four relationships: (1) percent Negro and achievement, (2) percent Negro and mean intellectual ability, (3) mean intellectual ability and achievement, and (4) socioeconomic status and achievement. Matzen found that, in general, achievement varied inversely with percent Negro; however, he felt this relationship might be the product of classroom grouping practices in which few high-achieving Negroes were placed with high-achieving whites. Matzen found that the Intelligence Quotient also varied inversely with percent Negro with many exceptions and the relationship not being a perfect one. Achievement was found to vary directly with socioeconomic class. When Matzen controlled for Intelligence Quotient and socioeconomic status, the achievement of students still fell as the percent Negro in schools increased but this relationship was not significant statistically. In grade seven the inverse relationship between percent Negro and achievement was weaker than in grade five. Matzen attributed this to the fact that students were homogeneously grouped at grade seven so that higher-achieving Negroes were placed with higher-achieving whites.[1]

Matzen, realizing that his findings could be interpreted to mean that percent Negro in a classroom should be minimized for maximum achievement, theorized that a new variable which he called "E.Q." for educational quality should be considered.

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[1]Stanley P. Matzen, "The Relationship Between Racial Composition and Scholastic Achievement in Elementary School Classrooms" (Doctoral dissertation, Stanford University, 1965; Ann Arbor, Mich.: University Microfilms, 66-2518), cited by Meyer Weinberg, Desegregation Research, pp. 55-58.

In Matzen's "E.Q." indices of teacher competence and motivation, instructional materials and texts, and enrichment value of the school environment might be negatively correlated with percent Negro and positively related to I.Q., achievement, and socio-economic status. Equality of educational opportunity would then greatly reduce or eliminate the negative effect of percent Negro on achievement.[1]

In 1966, Anderson studied the achievement of seventy-five Negro fourth, fifth, and sixth graders in five desegregated elementary schools as compared to that of similar students in three segregated, all-Negro elementary schools. Anderson reported that the achievement of Negro students in the desegregated schools was significantly higher. Anderson also noted that students who entered the desegregated schools at the fifth or sixth grade did not achieve as high as similar students in segregated schools.[2] No control for socioeconomic class was given, so that it was difficult to evaluate the validity of this study. Some control of socioeconomic class would be necessary to assure that students in the segregated and desegregated schools were equivalent.

Lockwood compared Negro achievement in racially balanced and unbalanced schools in an upstate New York Community over a

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[1] Ibid.

[2] Louis V. Anderson, "The Effects of Desegregation on the Achievement and Personality Patterns of Negro Children" (Doctoral dissertation, George Peabody College for Teachers, 1966; Ann Arbor, Mich.: University Microfilms, 66-11237), cited by Meyer Weinberg, Desegregation Research, p. 58.

period of two years. No significant achievement differences were found between Negroes who had attended racially balanced or unbalanced schools. When Lockwood divided students into groups which had attended such schools for two years or more, however, those who had attended racially balanced schools showed significantly better achievement than those who had attended racially unbalanced schools.[1]

The Coleman Report

Equality of Educational Opportunity by James S. Coleman et al., popularly known as "The Coleman Report," was undertaken by direction of the U.S. Commissioner of Education and completed in 1966 in response to Section 402 of the Civil Rights Act of 1964:

> Sec. 402. The Commissioner shall conduct a survey and make a report to the President and the Congress, within two years of the enactment of this title, concerning the lack of availability of equal educational opportunities for individuals by reason of race, color, religion, or national origin in public educational institutions at all levels in the United States, its territories and possessions, and the District of Columbia.[2]

Coleman's survey sought to answer the four following major questions:

1. To what extent are the racial and ethnic groups segregated in the public schools?

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[1] Jane D. Lockwood, "An Examination of Scholastic Achievement, Attitudes and Home Background Factors of Sixth-Grade Negro Students in Balanced and Unbalanced Schools" (Doctoral dissertation, University of Michigan, 1966; Ann Arbor, Mich.: University Microfilms, 67-8303), cited by Meyer Weinberg, Desegregation Research, p. 58.

[2] Coleman, Equality of Educational Opportunity, p. iii.

2. Do the schools offer equal educational opportunities in terms of a number of criteria regarded as good indicators of educational quality?

3. How much do students learn as measured by their performance on standardized achievement tests?

4. What is the relationship between students' achievement and the kinds of schools they attend?[1]

Measurement of Achievement

Coleman used the student's score on a verbal ability test, a vocabulary test that measured verbal skills, as the criterion of achievement throughout most of his study. An ability test versus an achievement test was chosen by Coleman for the following reasons:

1. Ability tests are in practice much like achievement tests except that they measure general educational achievement, while achievement tests are restricted to narrower subject areas.

2. School-to-school variance in achievement was found by Coleman to be greatest for the verbal ability test and less for the nonverbal ability, reading comprehension, and mathematics achievement tests in that order.

3. Achievement tests rather than ability tests showed the most decline in school-to-school variation in later grades as compared to earlier grades, suggesting ability tests were even more responsive to school differences.

4. When an attempt was made to explain the variance in individual achievement, holding family background constant, and

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[1] Ibid., p. iii-iv.

entering school characteristics factors, a higher proportion of the ability test score was explained than the achievement tests scores.

5. School factors did not account for a greater proportion of the variance in reading comprehension, independent of family background factors, than that in verbal ability, since the relation between family background factors and reading comprehension did not decline more over the years in terms of school-to-school variance than that for verbal ability and family background factors.[1]

Coleman explained the seemingly illogical fact that ability tests scores vary more from school to school and appear to be more affected by school characteristics than achievement tests by the fact that schools tend to teach the material tested by achievement tests in similar ways. The material tested by ability tests, on the other hand, is taught less directly by the school, and therefore, with differing degrees of success. Students become more alike as they progress in school in regard to skills that are most directly related to the standard curriculum. Since most schools approach the teaching of skills measured by achievement tests in a similar manner as part of a standard curriculum, the school-to-school variance in achievement is compressed. It is even more paradoxical that the material tested by ability tests is evidently learned in schools differently as evidenced by the greater school-to-school variance in ability tests.[2]

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[1]Ibid., 1:292-294. [2]Ibid., 1:294-295.

Sources of Variation in Achievement

Coleman had reason to be careful to select an achievement measure that would be most likely to show school-to-school differences in achievement; however, one must not overlook the fact that his survey was cross-sectional and did not involve pretests and posttests for individuals, even though he has referred to a decline in the school-to-school variation in achievement tests compared to ability tests in earlier and later grades.

Coleman identified three possible sources of school-to-school variation in achievement:

1. Differences from one school to another in school factors affecting achievement.
2. Differences from one community to another in family backgrounds of individual including abilities of students.
3. Differences from one community to another in influences outside school, apart from the student's own family.[1]

Coleman also identified four possible sources of within-school variation in achievement:

1. Differences in pupils' abilities in the same school.
2. Differences in family backgrounds of the pupils in the same school.
3. Differences in school experience among students within the same school (i.e., different teachers, different courses, etc.).
4. Different influences within the community on different students toward achievement (such as community attitudes which may discourage high achievement among lower status children, and encourage it among higher status children).[2]

For each racial and ethnic group that Coleman identified he divided the total variation of test scores into two parts:

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[1] Ibid., 1:295.

[2] Ibid., 1:295.

> (1) a part consisting of the variations of individual scores of pupils in school about the average score of his ethnic group in the school--this is the within-school variance; (2) a part consisting of the variations of the school averages about the average score for the Nation or region--this is the school-to-school or the between school variance.[1]

After examining school-to-school variations in achievement Coleman made three important observations:

1. For each group, ethnic and racial, at all grade levels school-to-school variations were much smaller than variations within schools. Possible sources for variation in achievement such as community differences, variations in the average home background of the student body, or variations in school factors, therefore, accounted for much less of the total variation than that of individual students within each school. This finding to a great extent negated the concept that differences in achievement could possibly be accounted for by differences between schools.

2. In contrast to family differences in individual student background, school factors and community factors that might support achievement in different ways accounted for a much smaller part of the variation in achievement. Coleman theorized that if either school factors or community differences in support of school achievement had been responsible for a large part of achievement variation, then school-to-school differences would have increased from grades one through six. This was not found to be the case, however, since school-to-school variation remained almost consistent with differences in variation observed at grade one. Coleman concluded that most of the variation in student

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[1]Ibid., 1:296.

achievement was not due to school factors at all but rather to differences in skills that children brought to school with them from the home environment. The tests Coleman gave first-graders showed differences that could not be accounted for by school factors at all, since these tests were given early in grade one. Coleman further concluded that the effect of schools on learning differences was not sufficient to overcome initial differences in achievement potential that are the result of each child's background. In Coleman's study children who belonged to groups that started school at a disadvantage would be likely to retain this disadvantage based on observations of older students with similar characteristics.

3. Coleman did discover, however, that school factors had a different effect on different ethnic and minority groups. School-to-school variations in achievement were greater in grades one through six for students in the South both Negro and white. These school-to-school variations had the greatest increase from grades one through six for Negroes in the South. This suggested that school factors or differences in the quality of schools affected Negroes, and particularly Negroes in the South, more than it did white students. Negroes in the South who started school at a considerable disadvantage compared to whites seemed to be most sensitive to differences in school factors, while whites appeared to be the least sensitive.[1]

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[1] Ibid., 1:296-97.

Student Body Characteristics

In order to see how much of the variance in achievement student body characteristics account for, Coleman separated school characteristics into three groups:

1. Facilities, curriculum, and other characteristics of the school itself
2. Characteristics of the teaching staff
3. Characteristics of the student body[1]

Coleman used eight variables in his regression analyses of the relationship of student body characteristics to achievement: three representing student backgrounds and attitudes, two representing school factors, two representing teacher factors, and one representing student body qualities. Student background factors were used only for control purposes. First the amount of variance that all eight variables accounted for in common was calculated. Then the amount of variance that seven of the variables accounted for, omitting one single variable each time, was determined. The difference between these two variances produced the unique contribution that each variable could be said to have accounted for or produced.[2]

The main result of Coleman's analyses of the relationship of student body characteristics to achievement was that "Attributes of other students account for far more variation in the achievement of minority group children than do any attributes of school facilities and slightly more than do attributes of staff."[3]

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[1] Ibid., 1:302. [2] Ibid., 1:302-304. [3] Ibid., 1:302.

Coleman used another technique in which he first let school variables account for as much of the total variance as possible then added the student body characteristics variable, while controlling the student's background statistically. At grades one and three neither school factors nor the added student body characteristics could account for much of the total variance. In grades twelve, nine, and six, however, when student body characteristics were added to school factors they more than doubled the amount of variance explained for some groups and increased it for all groups.[1]

Another important finding that Coleman made about the relationship of student body characteristics to achievement was that the highest-achieving groups, whites and Oriental Americans, were influenced the least in achievement by the characteristics of their fellow students. Coleman qualified this finding by stating that this relationship would depend, of course, on the relative number of high and low-achieving students in a particular school.[2] From a practical standpoint one could infer that integrating low-achieving Negro students with whites from the lower socioeconomic levels would probably not raise the achievement level of either group.

Coleman also found that the achievement of Negroes in the rural South appeared to vary the most with variations in the characteristics of the student body. This phenomenon was explained by Coleman as being the product of the probability

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[1]Ibid., 1:304. [2]Ibid., 1:304.

that Negroes in stable, rural areas in the South had little opportunity in the past to be exposed to children of different educational backgrounds than their own due to segregation and isolation.[1]

Racial Composition of the Student Body

In examining the effect of the racial composition of the student body on achievement Coleman prefaced his findings with the statement that white and Negro students in racially integrated schools at the time of his study were often not truely typical of their respective races. Coleman separated the relationship between achievement and the racial composition of a school's student body into several components:

> i. Effects due to different facilities and curriculum in the school itself.
> ii. Effects due to differences in educational deficiency or proficiency of fellow students that are correlated with race, though not universally so.
> iii. Effects due to racial composition of the student body apart from its level of educational proficiency.[2]

In order to determine what the racial composition of the student body might predict about the achievement of each group, while controlling for the student's own family background characteristics, Coleman examined the achievement of each group under these different levels of prior information:

> (A) In the first instance, if we know nothing about the school except its per-pupil instructional expenditure;
> (B) In the second case, if we know also a variety of school facility and curriculum characteristics;
> (C) In the third case, if we know also several characteristics of the student body, such as those examined in the preceding section.[3]

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[1] Ibid., 1:304-305. [2] Ibid., 1:307. [3] Ibid., 1:307.

Under each of these conditions the statistical question that Coleman attempted to answer was what the racial composition of the student body, as measured by the proportion of white students who were neither Puerto Rican or Mexican American, would tell about the achievement of each racial or ethnic group. The results of these analyses did explain a remarkable amount of the variance in comparison with the amount of variance accounted for by most school factors, taking into consideration that the total between-school variance accounted for by school factors was less than 20 percent for Negroes and less than 10 percent for whites.[1]

The overall results of Coleman's examination of the relationship between the achievement of students from different racial and ethnic groups and the racial composition of the student body were as follows:

1. As the proportion of white in a school increases, the achievement of students in each racial group increases.

2. This relationship increases as grade in school increases with a total absence of the relationship at grade three and the strongest relationship at grades nine and twelve.

3. The addition of condition (B), knowledge of a variety of school facility and curriculum characteristics, to condition (A), knowledge of the per-pupil instructional expenditure, only slightly reduced the added influence of racial composition. This led to the conclusion that better facilities and curriculum did not account for the higher achievement of all racial and ethnic groups in schools with a greater proportion white. When

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[1]Ibid., 1:307.

condition (C), characteristics of the student body, was added, however, it greatly reduced the added variance explained by racial composition of the student body. The higher achievement of students of all racial and ethnic groups in schools with a greater proportion white in the student body was, therefore, perhaps entirely related to condition (C), characteristics of the student body, which included the student's background and educational aspirations, rather than the racial composition of the student body.[1]

Coleman felt that the sum importance of his findings for equality of educational opportunity rested on the implications of the following results considered as a whole:

> 1. The great importance of family background for achievement;
> 2. The fact that the relation of family background to achievement does not diminish over the years of school;
> 3. The relatively small amount of school-to-school variation that is not accounted for by differences in family background, indicating the small independent effect of variations in school facilities, curriculum, and staff upon achievement;
> 4. The small amount of variance in achievement explicitly accounted for by variations in facilities and curriculum;
> 5. Given the fact that no school factors account for much variation in achievement, teachers' characteristics account for more than any other--taken together with the results from section 2.3, which show that teachers tend to be socially and racially similar to the students they teach;
> 6. The fact that the social composition of the student body is more highly related to achievement, independently of the student's own social background, than is any school factor;
> 7. The fact that attitudes such as a sense of control of the environment, or a belief in the responsiveness of the environment, are extremely highly related to achievement, but appear to be little influenced by variations in school characteristics.
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> Taking all these results together, one implication stands

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[1] Ibid., 1:307-310.

> out above all: That schools bring little influence to bear on a child's achievement that is independent of his background and general social context; and that this very lack of an independent effect means that the inequalities imposed on children by their home, neighborhood, and peer environment are carried along to become the inequalities with which they confront adult life at the end of school. For equality of educational opportunity through the schools must imply a strong effect of schools that is independent of the child's immediate social environment, and that strong independent effect is not present in American schools.[1]

Coleman thus theorized that lower Negro achievement in the past in segregated school systems had actually been reenforced by lack of opportunity to associate in school with white students who had better educational backgrounds and higher educational aspirations in general. Schools in the past had, in effect, not exerted an independent influence on student achievement at all, but rather had maintained existing socioeconomic levels of Negroes and other minorities. Students who started school at a disadvantage in comparison with the majority culture retained that disadvantage. Per-pupil expenditure, school facilities, and curriculum could not and did not, if one accepts Coleman's conclusions, make a significant difference in the achievement variance when compared with the stronger effect of student body characteristics.[2]

Post-Coleman Studies

On Equality of Educational Opportunity

Because of the importance of Coleman's findings and the difficulty that many experienced in interpreting his study a number of Harvard University faculty members under the direction

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[1]Ibid., 1:325 [2]Ibid., 1:311-12.

of Frederick Mosteller and Daniel P. Moynihan undertook an independent study of Coleman's data and published their reanalyses of these data in a report entitled On Equality of Educational Opportunity in 1972. In their chapter of this report, "Race and the Outcomes of Schooling," Cohen, Pettigrew, and Riley stated that although the Supreme Court's 1954 decision which ruled that separate but equal schools for whites and Negroes were unconstitutional had been partly based on its view that segregated schools damaged Negro achievement by having a bad effect on motivation to learn, no real empirical evidence to support this contention had been available until the Coleman study which at least provided some evidence that student body characteristics such as educational background and aspiration for education were related to achievement of Negroes. Since more white students possessed higher educational backgrounds and higher educational aspirations, the only way to provide many schools such as predominantly Negro ones with a majority of students with such backgrounds and aspirations would be to integrate these schools racially. Coleman's findings, however, tended to discredit earlier theories of a direct, causal relationship between racial composition of student body and achievement, since the achievement benefits of racial integration appeared to be the consequence of different racial distributions in the social classes.[1]

Cohen, Pettigrew, and Riley posed two questions about Coleman's findings on the relationship between racial composition and achievement: (1) How adequate was the "Coleman Report" in

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[1]Mosteller and Moynihan, On Equality of Educational Opportunity, p. 344.

isolating the factors of social class and race in order to determine how much of the achievement variance could be accounted for by each? and (2) Was there a selection or causal priority factor that caused Negroes in schools which were more advantaged and predominantly white to show higher achievement? Cohen, Pettigrew, and Riley suggested that Negroes in predominantly white, more advantaged schools may themselves come from more advantaged homes, since Negroes may, like whites, seek to move to those neighborhoods where the schools are good. They added, moreover, that even in marginally integrated schools ability grouping may place more academically able Negro students in predominantly white classrooms.[1]

Cohen, Pettigrew, and Riley replicated Coleman's regression analysis at grade nine of the unique contribution to percentage of explained variance in individual verbal ability accounted for by "school percent Negro" and found, as Coleman had, that adding social class composition of the student body variables to "school percent Negro" caused the latter to diminish to the vanishing point. In using another relevant statistic in regression analysis, standardized regression coefficients or Beta weights, the addition of social class measures, while controlling for individual student background characteristics, actually increased the Beta weight for percent Negro at grade nine from -.147 to -212, which Cohen, Pettigrew, and Riley interpreted to mean that a good portion of the variance attributed to school social class was shared with "school percent Negro." This finding

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[1] Ibid., p. 345.

was in contrast to Coleman's conclusion, using only unique contribution to amount of variance explained, that "school percent Negro" was insignificant when social class was controlled. Cohen, Pettigrew, and Riley felt that had they used other statistics such as Beta weights in their regression analysis, the authors of the "Coleman Report" might have concluded that "school percent Negro" and school social class composition were actually confounded rather than two separate factors that produced the same effect. While the reanalysis of Coleman's data for grade twelve was not quite as convincing as that for grade nine, it still supported the concept that "school percent Negro" was not just a function of social class. At grade six adding school social class measures effectively eliminated the effect of racial composition on verbal achievement, although a small, but insignificant, independent effect of schools' racial compositions remained, indicating that, at this level, racial composition did act more like a substitute for school social class than as a confounded factor.[1]

The issue of selection processes by which students are assigned to schools on the basis of demonstrated academic ability or attend schools in areas selected by parents because of the neighborhood school's reputation for quality education seemed critical to Cohen, Pettigrew, and Riley, since they felt that it is difficult or impossible to measure any achievement factor without first knowing the initial ability of students. The extent to which such selection processes may have been present in Coleman's study is not known.[2]

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[1]Ibid., pp. 345-52. [2]Ibid., 350-51.

The issue of selection can be conceptualized by asking whether it was the association in school with peers who had high educational aspirations and educational backgrounds prior to formal schooling that would predict academic achievement that accounted for the higher achievement of Negro students in the integrated schools in Coleman's sample or whether this higher achievement of Negroes was primarily due to the better educational backgrounds and higher educational aspirations of these students and their families who chose to live in neighborhoods with predominantly white schools precisely because they believed these schools to be better? If the Negro students who attended the integrated, predominantly white schools in Coleman's sample were different from most Negro students at that time and different in experiences not related to school but to home environment, this assumption would still be consistent with Coleman's assertion that schools do not exert an influence on student achievement independent of student background and social class factors. If such a selection process had operated in Coleman's study, one might be less likely to accept the idea that providing Negro students with schools in which there is a white majority through racial balance plans such as court-ordered or voluntary busing would probably improve Negro achievement.

In commenting on the inadequacy of the Coleman study as a basis for public school policy Henry S. Dyer has well stated the problems associated with the importance Coleman attributed to student-body characteristics as a factor in achievement in the following paragraph:

> By looking only at the amount of accuracy added by taking the student-body characteristics into account, we arrive at the inference that the more favorable the student-body characteristics are, the better the chances are that the children will do well on verbal tests. This, however, is an inference concerning the way things _are_ for these children, not what they _might be_ under different circumstances. That is, it raises, but does not answer, the question: If we actually moved the Negro children in the early grades from schools where the student-body characteristics are unfavorable to schools where the student-body characteristics are more favorable, would the change in schools bring about a rise in the children's verbal scores?[1]

Racial Isolation in the Public Schools

In its 1967 report, _Racial Isolation in the Public Schools_, the U.S. Commission on Civil Rights examined the relationship between social class, racial composition of the student body, and achievement for white and Negro students in addition to other aspects of the "Coleman Report" such as facilities, curriculum, teacher quality, etc. by performing its own analyses of Coleman's data. The Commission had also contracted a study of the relationship, if any, between social class, racial composition of the student body, and achievement for white and Negro students by Alan B. Wilson, entitled "Educational Consequences of Segregation in a California Community," contained in an appendix to _Racial Isolation in the Public Schools_.[2]

In its analysis of the effect of social class composition of schools upon student achievement, the U.S. Commission on Civil Rights, using Coleman's data, concluded as Coleman had that the social class composition of schools was the most important variable

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[1] Ibid., p. 408.

[2] U.S., Commission on Civil Rights, _Racial Isolation in the Public Schools_, 2 vols. (Washington, D.C.: Government Printing Office, 1967), 1:73-114.

in student achievement other than the student's own social class, and that both disadvantaged and more advantaged white and Negro students performed better in schools with a social class composition of middle-class or higher. Wilson's Richmond, California, study also supported this finding. Wilson measured the relative importance of individual and school social class factors for white and Negro students separately and concluded that school social class was more strongly related to Negro achievement, while individual student social class was more strongly related to white achievement. Wilson's study also examined the effects of individual student social class and school social class for the same individuals over their entire school careers and concluded that individual student social class was more strongly related to achievement in the early elementary years, while school social class gradually increased as a factor until at grade eight it was as strong as individual student social class as a factor in achievement.[1]

In analyzing Coleman's data on the relationship between (1) the social class level of individual Negro students, (2) the social class level of their schools, and (3) the racial composition of classrooms in these schools, the Commission on Civil Rights made the following observations:

1. When relatively disadvantaged Negro students are in class with a majority of similarly disadvantaged white students their performance is higher than when they are in a class with a majority of equally disadvantaged Negroes.

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[1]Ibid., 1:84-86.

2. When relatively advantaged Negro students are in class with a majority of similarly advantaged white students their performance is higher than when they are in a class with a majority of equally advantaged Negroes.

3. When relatively disadvantaged Negro students are in class with a majority of relatively advantaged Negro students their performance is higher than when they are in a class with a majority of equally disadvantaged Negroes.[1]

The Commission on Civil Rights interpreted the above comparisons as suggesting a relationship between the performance of Negro students and the racial composition of classrooms, while pointing out that such a relationship was not explained by their observations. The Commission offered the following possible explanations of the suggested relationship between the performance of Negro students and the racial composition of classrooms:

> First, there may be differences in the quality of education offered in majority-Negro and majority-white schools which account for the higher average Negro performance in majority-white schools.
>
> Second, it may be that there is a process of selection involved, whereby only initially more able Negro students attend majority-white schools.
>
> Finally, there may be student environment factors directly connected with racial composition which relate to the attitudes and performance of Negro students. . .[2]

Wilson, in his Richmond, California, study was able to examine the question of selection. Wilson sampled 5,545 students of 17,000 attending eleven public junior and senior high schools in the Richmond area in the spring of 1965. Four thousand seventy-seven students in the sample completed questionnaires and were

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[1]Ibid., 1:90-91. [2]Ibid., 1:91.

retained in the study. The student population was stratified according to sex, race, school, and grade-level initially, and random samples were selected from each stratum. The home residence for each student in the sample was recorded and the neighborhood for each defined as his own school district plus contiguous districts. The percent Negro and the percent lower class was determined for each school the student had attended. The twelve grade levels were further divided into four levels: (1) the primary grades, one through three; (2) the intermediate grades, four through six; (3) the junior high school grades, seven through nine; and (4) the senior high school grades, ten through twelve. The percent Negro and the percent lower class were then averaged over these four subdivisions. Wilson then recorded the I.Q. test score for each student in his sample based on a test given soon after students had entered school at grade one. Wilson used this primary grade I.Q. test score as a control for initial differences in ability in analyzing subsequent academic achievement in later grades.[1]

Since his study dealt with the same students over a period of several grade levels and earlier achievement was known, Wilson accounted for differences in first grade verbal achievement in examining the effect of school social class upon achievement in later grade levels. Wilson concluded that the social class composition of the school had a strong effect on later achievement even when earlier achievement differences were controlled.[2]

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[1] Ibid., 2:165-74. [2] Ibid., 1:88.

In considering the question of selection in the higher performance of Negro students in majority-white schools to determine whether or not this effect had been produced by initial higher abilities of these students, Wilson concluded:

> . . . The Negro students who attended integrated schools had higher mental maturity test scores in their primary grades, and came from homes better provided with educative materials.[1]

In a related question of the effect of the racial composition of majority-white schools on the higher achievement of Negro students in these schools apart from initial greater ability, Wilson held the early elementary achievement of these students constant and then examined later achievement through an analysis of covariance. Wilson's analysis showed the following:

> . . . that racial composition of the school, while tending to favor Negro students in racially integrated schools, does not have a substantial effect--not nearly so strong as the social-class composition of the school.[2]

The Commission on Civil Rights, while reporting that the Richmond, California, Negro students in majority-white schools were determined by Wilson to have been initially more able, seemed to discount his finding on the basis that Wilson's sample of 4,077 students was relatively small and could not adequately examine the effect of racial composition of majority-white schools on Negro achievement in general.[3] Yet Wilson had described his study as one which was ". . . intended to isolate effects of segregation per se upon the development of academic competence,

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[1]Ibid., 2:185. [2]Ibid., 2:186. [3]Ibid., 1:101.

and the ramifications which segregation may have for students' self-concept, aspirations, and social behavior."[1] It seems odd that the Commission on Civil Rights would have approved Wilson's study for contract, if the Commission had doubts about the adequacy of his sample size for generalization purposes. It is equally peculiar that the Commission did not express similar reservations about the generalization of other findings of Wilson's study.

In a further investigation of this issue of selection the Commission performed further analysis on the effect of the racial composition of the school on the performance of less able Negro students in classes of different racial composition using Coleman's data. The Commission showed that the verbal achievement of ninth grade Negroes in low ability groups, in majority-white schools, in classrooms of different racial compositions, increased on the average as percent white increased. The Commission also demonstrated that when the average verbal achievement of the schools was held constant the achievement of disadvantaged ninth grade Negroes in the lowest achieving schools increased in majority-white classes.[2]

Cohen, Pettigrew, and Riley, also concerned with the question of selection in the Commission on Civil Rights' analysis of the effect of racial composition of the classroom on Negro achievement at grade nine, showed that Negroes in the academic curriculum were more likely to have more white classmates than those in other curricula, but not in ability groups once curricular assignment was controlled. Cohen, Pettigrew,

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[1]Ibid., 2:165. [2]Ibid., 1:101-103.

and Riley's findings supported the Commission's conclusion that percent white in the classroom was positively related to the achievement of Negro students. When the factor of the racial composition of the school was added, however, the Commission's conclusion about the relationship of racial composition of the classroom to Negro achievement was not supported, since Negroes in majority-Negro schools in classes with a majority of whites achieved lower than those in classes with a majority of Negro students. Cohen, Pettigrew, and Riley pointed out that although the relationship between classroom racial composition and Negro achievement was significant statistically, actually assigning twelfth grade Negro students to mostly white classes would increase their verbal achievement only 1.94 points--less than one sixth of the difference between average Negro and white achievement in these schools at grade twelve.[1]

Other Post-Coleman Cross-Sectional Studies

The Dumbarton Research Council, Oakland, California, in a 1966 unpublished study for the Commission on Civil Rights, sought to determine whether or not significant achievement differences existed between Negro students who had attended predominantly Negro schools and racially balanced schools and between whites who had attended all-white schools or only racially balanced schools. A sample of four hundred high school graduates who had attended Oakland's public schools continuously

[1]Mosteller and Moynihan, On Equality of Educational Opportunity, pp. 350-59.

since first grade in 1953 was obtained. The results of the study showed:

1. White students performed better than Negro.

2. Negro students in racially mixed schools performed better than those in segregated schools.

3. White students performed better in all-white schools than in racially mixed schools.[1]

While Negroes who had attended segregated, all-Negro schools were very similar to those who had attended racially mixed schools in terms of such socioeconomic factors as parents' income, occupations, and income level, Negroes who attended racially mixed schools came from smaller families, with both parents more often in the home, had visited more white families, and the mother usually worked and was seldom on welfare. The higher social class of white students who had attended all-white schools was felt to have accounted for their higher achievement in comparison to whites who had attended racially mixed schools.[2]

Although the Dumbarton study was longitudinal in the sense that it followed the academic careers of students in the sample over all their school years, it was considered a cross-sectional study, since no "before" and "after" effects were measured. Unfortunately the Dumbarton study did not control for the socioeconomic levels of students in the sample so that any effect of racial composition of the school on achievement

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[1] Dumbarton Research Council, "Race and Education in the City of Oakland," Oakland, California, October, 1966, Study for U.S. Commission on Civil Rights, cited by Meyer Weinberg, Desegregation Research, pp. 44-46.

[2] Ibid.

would probably be confounded with social class. After taking this serious limitation into consideration, one could say that the Dumbarton study seemed to show that racial integration had an academically beneficial effect on Negro students but not on whites.

In a 1967 study in which standardized achievement test scores were compared in the Berkeley, California, Unified School District by types of school and race, Sullivan identified three types of schools:

1. Predominantly Negro schools with compensatory education programs of three or four years duration such as four years of a developmental and remedial reading emphasis program under Title, I, Elementary and Secondary Education Act; three years of Headstart; and three years of small-class instruction

2. Predominantly white schools integrated by busing approximately 250 Negro students from a low socioeconomic level area

3. Integrated schools in racially mixed residential areas[1]

Sullivan partitioned scores on the paragraph-meaning section of the Stanford Achievement Test in grades one through six into low, medium, and high thirds and by race and type of school. There were 66.2 percent of Negroes in the predominantly Negro schools with compensatory programs in the lower third in achievement on this section of the Stanford; 33.4 percent of

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[1]Neil V. Sullivan, "Discussion: Implementing Equal Educational Opportunity," Harvard Educational Review 38 (Winter 1968): 148-55.

Negroes in predominantly white schools integrated by busing; and 43.3 percent of Negroes in schools integrated by racially mixed residential areas. In predominantly Negro schools 4.5 percent of Negroes were in the upper third of the achievement range on this section of the Stanford; 21.4 percent of Negroes in predominantly white schools integrated by busing; and 12.6 percent of Negroes in schools integrated by racially mixed residential areas.[1]

Sullivan pointed out that the social class of students in the integrated schools in racially mixed residential areas could not be separated from integration as a factor in student achievement. Sullivan did not consider the lack of information about student social class as a problem in comparing the achievement of Negroes from a low socioeconomic level area bused into predominantly white schools with Negroes who remained in predominantly Negro schools. Since no social class data were available on individual students, one cannot accept Sullivan's finding that in the case of bused students ". . . Differences in achievement can be attributed to integration."[2]

Sullivan also concluded that white students achieved significantly better in integrated schools; however, the social class of white students in predominantly Negro schools was not known and would certainly have been a factor in achievement.[3] Sullivan's study examined <u>levels of achievement</u> rather than <u>changes in achievement</u> and was not properly designed to support his conclusions.

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[1]Ibid. [2]Ibid., p. 153. [3]Ibid.

Using data originally gathered for Coleman's study and the reanalyses of that data by the U.S. Commission on Civil Rights, McPartland studied the effect of school and classroom desegregation or integration on academic achievement. McPartland used verbal achievement test scores of 5,075 Negro ninth graders in New England and the Middle Atlantic states in his analysis and made the following conclusions:

1. Classroom integration had a positive effect on Negro achievement for the most part, independent of family background.

2. The average achievement of Negroes, regardless of the racial composition of the school, increased as the proportion of their classmates that were white increased.

3. The greater the percentage white in a school, the greater was the benefit of classroom integration to the achievement of Negroes.

4. When family background and classroom racial composition were controlled, the percent white in the school had no appreciable influence on Negro achievement.

5. Negroes who attended segregated classes in integrated schools showed no increase in academic growth, and perhaps even a decrease, when compared to those who attended segregated schools.[1]

McPartland's study did not actually show a cause and effect relationship between integration and Negro achievement

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[1]James McPartland, The Relative Influence of School Desegregation on the Academic Achievement of Ninth Grade Negro Students, Intermim Report (Baltimore, Maryland: Center for the Study of Social Organization of Schools, John Hopkins University, September 1967), cited by Meyer Weinberg, Desegregation Research, pp. 65-66.

but rather a relationship between racial composition of the classroom and Negro achievement.

Bryant in his study of some effects of racial integration on standardized test scores, teacher grades, and dropout rates of high school students in a small Texas community, showed gains for Negro and white students that were significant at the .01 level of confidence. As Weinberg has also observed, however, since Bryant did not control for either intelligence or socioeconomic level of students in his sample, the effect of racial composition of the school on achievement was probably overstated.[1]

In a study of a Riverside, California, desegregation plan, carefully monitored in cooperation with the University of California at Riverside and Los Angeles, the following independent variables were identified:

1. Predesegregation characteristics of the child
2. Characteristics of the home
3. Characteristics of peer group interaction
4. Characteristics of school environment
5. Impact of the "barrio" environment

Dependent variables were identified as:

1. Academic achievement
2. Intellectual ability
3. Peer group interaction

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[1]James C. Bryant, "Some Effects of Racial Integration of High School Students on Standardized Achievement Test Scores, Teacher Grades, and Dropout Rates in Angleton, Texas" (Doctoral dissertation, University of Houston, 1968; Ann Arbor, Mich.: University Microfilms, 69-768), cited by Meyer Weinberg, Desegregation Research, pp. 72-73.

4. Attitude toward the outgroup

5. Feelings about self

6. Emotional adjustment

7. Achievement motivation

8. Level of aspiration

9. Parent values, attitudes, aspirations, interaction patterns, and involvement in community activity[1]

The Riverside study extended from June 1967, until May 1972, and in a three-year report of the study Singer reported that white achievement had not decreased, while achievement of minority group children, including Negroes, had not increased.[2] The Riverside study was not longitudinal but cross-sectional and did not necessarily involve the same children. Purl, in a 1968 report of this study, determined that increases in I.Q. and reading achievement in the desegregated Riverside sample could be accounted for only by increases in scores of white students.[3]

Long analyzed achievement of white and Negro students in integrated and segregated kindergarten through second grade schools in a northern suburban community and found no relationship between integration and achievement. Long's study was

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[1]E. Raymond Barry et al., Factors Contributing to Adjustment and Achievement in Racially Desegregated Public Schools (Riverside, Calif.: United School District, August 1966), cited by Meyer Weinberg, Desegregation Research, pp. 230-31.

[2]Harry Singer, Effect of Integration on Achievement in Riverside: A Three-Year Trend (Riverside, Calif.: Riverside United School District, August 1969), cited by Meyer Weinberg, Desegregation Research, pp. 230-31.

[3]Mabel C. Purl, Progress Report (Riverside, Calif.: Riverside School Study, October 1968), p. 4, cited by Meyer Weinberg, Desegregation Research, pp. 230-31.

interesting in that Negro and white students in the sample were close to being from the same socioeconomic levels, and Negro students in the sample scored at least at national norms.[1]

Williams, in a 1968 study of achievement differences between Negro high school seniors from a segregated high school and a desegregated high school in a Florida community, showed that those who had attended a desegregated high school for four years performed significantly better in five of six achievement tests than those who had attended a segregated high school.[2]

The Office of Civil Rights, U.S. Department of Health, Education, and Welfare, in a 1970 article, reported that Negro tenth graders in the desegregated high schools of Rome, Georgia, made a year's achievement growth, while those who remained in segregated Negro high schools made little growth. No indication was given that controls for the socioeconomic levels or initial abilities of students in the sample had been included in the study.[3]

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[1] David Long, "Educational Performance in Integrated and Segregated Elementary Schools" (Doctoral dissertation, Yeshiva University, 1968; Ann Arbor, Mich.: University Microfilms 68-10, 982), cited by Meyer Weinberg, Desegregation Research, pp. 73-74.

[2] Frank E. Williams, "An Analysis of Some Differences Between Negro High School Seniors from a Segregated High and a Nonsegregated High School in Brevard County, Florida" (Doctoral dissertation, University of Florida, 1968; Ann Arbor, Mich.: University Microfilms 69-16,050), cited by Meyer Weinberg, Desegregation Research, p. 75.

[3] U.S., Department of Health, Education, and Welfare, Office of Civil Rights, "Much Better Than They Expected," Integrated Education 8 (1970):47, cited by Meyer Weinberg, Desegregation Research, p. 80.

Four-Celled Studies with Control Group

Studies classified as four-celled with control group were those that had the following characteristics:

1. A random sample of an experimental and a control group was obtained.

2. Achievement measurements for both experimental and control groups before and after integration were used.

3. The degree to which other variables were controlled in this design would determine the degree to which a greater change in the experimental group at time two, after the experimental effect of integration, could be attributed to racial integration per se.

In an early study of this type in New Albany, Indiana, Samuels compared learning rates of Negro and white students who had attended desegregated schools for the first time at the junior high level. He also compared the performance of Negroes who attended racially mixed elementary schools with those who had attended segregated elementary schools. Samuels matched Negroes and whites in his sample on the basis of intelligence test scores and socioeconomic levels. He reported that the achievement gap between Negroes and whites in desegregated junior high schools began to narrow at the end of grade eight as measured by achievement tests scores and classroom grades over a period of two years. Samuels also observed that Negro students in racially mixed or integrated elementary schools began to achieve higher than those in segregated elementary schools at the end of grade three, and that this higher performance continued into grade six. Samuels concluded from his study that the

achievement gap between Negroes and whites narrowed with the length of the association of this group with whites in integrated schools, and that Negroes educated in racially mixed schools often achieved as high as whites in those schools.[1]

Fortenberry studied Negro achievement in Oklahoma City, under conditions of segregation and desegregation, comparing achievement scores of a sample of eighth and ninth grade Negroes who had attended segregated elementary schools up to grade six, but a desegregated one in grades seven and eight, with those of Negroes who had always attended a segregated school. Fortenberry used the sixth grade achievement scores of both groups, which had been similar at that level, as a control. He showed that by grade eight Negroes in desegregated schools had gained more in mathematics but not in reading. By grade nine Negroes in desegregated schools with racially mixed classes scored higher in arithmetic and language arts when compared to Negroes in segregated schools, while the latter scored higher in reading.[2]

In a 1966 study by the research department of Syracuse, New York, city schools, Negro elementary students were bused from a predominantly Negro school to a predominantly white one. At

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[1] Ivan G. Samuels, "Desegregated Education and Differences in Academic Achievement" (Doctoral dissertation, Indiana University, 1958; Ann Arbor, Mich.: University Microfilms 58-2934) cited by Meyer Weinberg, Desegregation Research, pp. 43-49.

[2] James H. Fortenberry, "The Achievement of Negro Pupils in Mixed and Non-Mixed Schools" (Doctoral dissertation, University of Oklahoma, 1959; Ann Arbor, Mich.: University Microfilms 59-5492), cited by Meyer Weinberg, Desegregation Research, p. 49.

the end of a year of this program, Negro students bused to the predominantly white school had made achievement gains that were not significantly different than those of Negro students who had remained at the predominantly Negro school. The achievement of white students at the predominantly white school was no different than that normal to them as a group. In another busing program Negro students from this same predominantly Negro school were bused to a different predominantly white school and did show significantly higher gains at the end of the year than those students who had remained at the predominantly Negro school.[1] This particular study illustrates clearly the lack of conclusive evidence that racial composition of the student body per se has an effect on the achievement of Negro students, since Negro students from the same elementary school did not make gains significantly different from students in their school that were not bused in one program, while Negro students bused to a different school did. Because of the disparity between achievement results at the two different predominantly white schools for Negro students bused to these schools, one must conclude that a factor other than integration was responsible for the gain or lack of gain in Negro achievement.[1]

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[1] U.S., Commission on Civil Rights, Hearing, Rochester, New York, September 16-17, 1966, Study of the Effect of Integration--Croton and Edward Smith Elementary School Pupils, by Research Department, City School District, Syracuse, N.Y. (Washington, D.C.: Government Printing Office, 1967), pp. 327-28, cited by Meyer Weinberg, Desegregation Research, pp. 33-34.

Wolman, in a 1965 study, analyzed changes in achievement of Negro elementary students transferred from practically all-Negro elementary schools in New Rochelle, New York, to several predominantly white elementary schools. Approximately half of the Negro students were transferred in this integration plan. Achievement tests taken a year later showed changes in achievement for Negroes transferred to predominantly white schools to be insignificant statistically in grades one through five when compared to that of Negroes who remained in the nearly all-Negro schools. Although the social class membership of Negro students transferred, those not transferred, and white students already in the predominantly white schools was comparable, achievement for white students was higher. In analyzing achievement changes for kindergarten students, however, Wolman observed that the achievement of Negro children transferred exceeded that of Negro children who remained in the almost all-Negro schools as well as that of white kindergarten children in the predominantly white schools to which they had been transferred. Wolman interpreted this finding as an indication that early integration might provide a compensatory effect on the achievement of Negroes.[1]

In a study of the effects of desegregation on the achievement of tenth grade Negro students over an eighth month period Klein tested at three schools: (1) a recently desegregated all-Negro school, (2) a segregated all-Negro school, and (3) a nearly all-white school. When controls for family size, parental occupation, and parental education were implemented,

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[1]T. G. Wolman, "Learning Effects of Integration in New Rochelle," Integrated Education (January 1965), cited by Meyer Weinberg, Desegregation Research, pp. 54-55.

the initially superior performance of Negroes in desegregated schools compared to those in segregated schools evaporated. Klein concluded that desegregation had no effect on the achievement of Negroes or whites; however, Weinberg questioned the randomness of Klein's sample, since Klein had also reported no differences in the achievement of groups of Negro students in segregated schools and whites in integrated schools matched on other characteristics.[1]

Slone studied the effect of pairing two schools for the purpose of racial integration and concluded that Negro students in the paired schools scored higher in arithmetic than those in segregated schools but not in other areas of achievement. Slone reported that whites in the paired schools continued to achieve at normal rates of achievement for their group.[2]

Wood, in a 1969 study, evaluated the effects of the Hartford, Connecticut, integration experiment, called Project Concern, in which mostly Negro inner-city children were bused to suburban schools. Wood obtained a sample of kindergarten through grade five Negro students who were not bused and matched them with the experimental bused group on the WISC-Verbal I.Q.

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[1]Robert S. Klein, "A Comparative Study of the Academic Achievement of Negro 10th Grade High School Students Attending Segregated and Recently Integrated Schools in a Metropolitan Area of the South" (Doctoral dissertation, University of South Carolina, 1967; Ann Arbor, Mich.: University Microfilms 67-15,565), cited by Meyer Weinberg, Desegregation Research, pp. 70-71.

[2]Irene M. Slone, "The Effects of One School Pairing on Pupil Achievement" (Doctoral dissertation, New York University, 1968; Ann Arbor, Mich.: University Microfilms 68-11, 808), cited by Meyer Weinberg, Desegregation Research, p. 74.

scores. Wood made his comparison of the experimental group with the control group one year after the Project Concern plan had been implemented. Wood found that in kindergarten and grade one achievement for the experimental group was greater than that for the control group in arithmetic, vocabulary, and verbal I.Q. In grades two and three total performance on the I.Q. test had increased significantly for the experimental group. In grades four and five vocabulary scores increased significantly for the experimental group. Achievement of whites, except those few included in the experimental group, remained the same in the predominantly white receiving schools and showed no effects of the addition of the experimental group to the student body.[1]

In another study of Project Concern after two years of this integration plan, Mahan and Mahan reported that bused students, in general, grades kindergarten through three, made significantly higher scores on mental ability and achievement tests compared to students in their schools of origin who had not been bused.[2]

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[1]Bruce H. Wood, "The Effects of Busing Versus Non-Busing on the Intellectual Functioning of Inner City, Disadvantaged Elementary School Children" (Doctoral dissertation, University of Massachusetts, 1969; Ann Arbor, Mich.: University Microfilms 69-5186), cited by Meyer Weinberg, Desegregation Research, pp. 78-79.

[2]Aline M. Mahan and Thomas W. Mahan, "Changes in Cognitive Style: An Analysis of the Impact of White Suburban Schools on Inner City Children," Integrated Education 8 (1970):60-61; cited by Meyer Weinberg, Desegregation Research, pp. 78-79.

Crane in a three year summary of Project Concern and its effect on the reading achievement of students in the project, sought to answer the following questions:

> 1. What was the reading achievement of Project Concern children as measured by standardized tests when compared to the normal reading expectancy of all children measured by these instruments?
> 2. What was the effect of early or late grade placement on the reading achievement of Project Concern children as measured by standardized tests?
> 3. What effect did the number of participating years have on the reading achievement of Project Concern children as measured by standardized test results?
> 4. What was the relationships (sic) of the reading achievement of Project Concern children as measured by standardized test results with the achievement of similar children in the validated schools which formerly enrolled these Project Concern children?[1]

Crane's study was included in four-celled studies with control group, although it did not actually meet the requirements for studies in this classification. Crane stated that he did not feel the need for a control group, since he was comparing the achievement of students in Project Concern with those from their schools of origin. Effectively, however, Crane did use these students from inner-city schools as a control group on the basis of their average performance. Crane's study also did not involve a before and after score but instead used only scores of experimental and control groups after the experimental effect.[2]

Crane used grade level equivalents in his study and reported that children in Project Concern, grade one through five, scored

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[1] Thomas Crane, A Three Year Summary of Hartford Project Concern: A Program of Urban-Suburban Cooperation (Hartford, Conn.: Connecticut State Department of Education, Bureau of Compensatory and Community Education Services, October 1970; Bethesda, Md.: ERIC Micro Form Systems, ED 047 064, 1970), pp. 1-3.

[2] Ibid., p. 3.

higher in reading level than Hartford inner city children who were not in the program. Crane also reported that the earlier children entered the program and the longer they remained in it, the closer their reading achievement would come to grade level norms. In the one specific example Crane gave of a comparison of the reading achievement of Hartford inner city children compared to those in Project Concern, inner city children at grade four scored a grade level equivalent in reading of 1.23 or one year and two months below grade level, while those in Project Concern scored 1.12 or one year and one month below grade level.[1] The magnitude of this difference from a practical viewpoint is not great.

Crane used grade placement scores or grade level equivalent scores, because the suburban school districts that were participating in Project Concern used six different standardized tests in reading, and he felt that the grade placement score was the best choice, since it was common to all these tests.[2] The use of averaged grade placement scores for statistical analysis, based on different norms for six different achievement tests, seems likely to greatly increase the possibility of error in measurement, since norms could change as well as the composition of student bodies that producedaverages. Average scores would always open the possibility of being influenced by extreme scores not typical of the class or school.

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[1] Ibid., pp. 4-7. [2] Ibid., p. 4.

Banks and DiPasquale, in a 1970, study compared student achievement in Buffalo, New York, Public Schools, before and one year after implementation of an integration plan for grades six, seven, and eight. In September 1967, nearly twelve hundred Negro students from segregated inner city schools in Buffalo were bused to predominantly white schools. Students in grades five, six, and seven, in June 1967, prior to the integration plan, and these same students, then in grades six, seven, and eight, in June 1968, one year after integration, were given the Stanford Achievement Test. The researchers stated three hypotheses about the effect of integration on achievement:

1. Negro students will gain more rapidly in integrated classes compared to those still in segregated classes.

2. White students will continue to make the same gains in integrated classes as they had in segregated classes.

3. Negro students in segregated classes will continue to gain at a lower rate of achievement if they remain in such classes.[1]

The sub-test, paragraph meaning, was chosen for a comparison of pretest and posttest scores of students before and after integration, since the researchers felt this measure was one that correlated highly with school achievement. No other reason nor supporting data were given for this choice. The

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[1]Ronald Banks and Mary Ellen DiPasquale, A Study of the Educational Effectiveness of Integration: A Comparison of Pupil Achievement Before and One Year After Integration; A Survey of the Attitudes of Principals, Teachers, Parents, and Pupils Involved in the Program (Buffalo, N.Y.: Buffalo Public Schools, 1970; Bethesda, Md.: ERIC Micro Form Systems, ED 053 576, 1970), pp. 1-3.

analysis of pretest and posttest averages showed the following:

1. White students had higher pretest scores.

2. Negro students who were in integrated schools and those who remained in segregated schools had approximately the same average pretest scores except in grade seven where those of integrated Negroes were higher.

3. White students made greater gains on posttest scores than integrated or segregated Negro students, although the researchers claimed they could not make a comparison of the rate of gains for white students in comparison with previous years due to the impossibility of isolating these scores.

4. Negro integrated students made greater mean growth (.83) than Negro students who remained in segregated schools whose mean growth was .56.[1]

An examination of the results of pretest and posttest averages for white students, integrated, and still segregated Negro students revealed, however, that segregated Negro students at grade five (grade six in the posttest) made greater gains than integrated Negro students at this grade level. While the difference in gains between segregated and integrated Negro students at this grade level was only .2 or two months in grade level equivalents, since only three grade levels were involved in the study, some qualification of the findings should have been made. This is especially true, when one considers that one out of three grade levels of Negro students that remained in segregated schools had a greater mean gain on the measure used in

[1] Ibid., pp 5-6.

this study than those who attended integrated schools. This study is perhaps a good example of how the mean can be misleading in a relatively simple analysis where no test of significance is used.[1]

Baltzell investigated the effect of court-ordered desegregation on academic achievement from 1970 to 1972 in the public schools of Duval County, Florida, which is in and about Jacksonville. According to Baltzell the desegregation of the Duval County schools was accomplished, after much hostility and active resistance in the community, in three successive stages:

1. Phase 0, 1970-1971, desegregation of the faculty and every Negro elementary school adjacent to an attendance zone with a predominantly white school

2. Phase I, 1971-1972, desegregation of the eighteen all-Negro elementary schools in the city, seven of which were closed and some sixth grade centers established

3. Phase II, 1972-1973, twenty three grade centers for grades six and seven establisned, busing already extensive in Phase I, became massive[2]

Baltzell designated academic achievement as measured by performance on the Stanford Achievement Test as the dependent or experimental variable in the study. Sex, race, degree of racial mixing in school, individual social class, and school

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[1]Ibid., p. 6.

[2]Catherine D. Baltzell, "Rapid Desegregation and Academic Achievement in a Large Urban School District," paper presented at the Annual Meeting of the American Education Research Association, Chicago, Ill., April 1974; Bethesda, Md.: ERIC Micro Form Systems, ED 090 282, 1974, pp. 1-3.

social class were originally selected. Individual social class could not be used, however, because of a lack of available data. Title I eligibility, which is based on economic and educational deprivation, was used to provide one measure of the social class of the school in addition to the geographic income level of the school's attendance area, prior to desegregation, provided by census information. Percent Negro was used as measure of degree of racial mixing experienced by individuals in school.[1]

Baltzell's sample contained 394 students, grades two, three, five, and six, for Phase 0 and 1,507 students, grades two, three, five, six, nine, and eleven, for Phase I. Half of each grade sample were students not involved in that particular phase of desegregation, while the other half were students who attended schools that had been desegregated during that same phase. The sample at each grade level was balanced according to sex and race.[2]

Baltzell used regression analysis to determine the amount of variance in achievement accounted for by each of the six independent variables on each subtest of the Stanford Achievement Test. A discriminant function analysis was also performed to investigate achievement differences between desegregated and segregated students within each phase of the desegregation plan. Since the results of these analyses were not satisfactory, an analysis of covariance, using desegregated and segregated students as the independent variable, was done but only for elementary.[3]

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[1]Ibid., pp. 6-8. [2]Ibid., pp. 8-9. [3]Ibid., pp. 9-10.

The results of Baltzell's regression analysis showed race to be the single greatest predictor of academic achievement in both phases of Duval County's integration plan. Socioeconomic variables were the second best predictors. Only 18 percent of the total variance was accounted for in Phase O and 30 percent in Phase I. In the analysis of covariance with the socioeconomic factors as covariants no significant difference in academic achievement was found between students who were integrated and those still segregated within each racial group. The exceptions to this finding were statistically significant differences between desegregated and segregated Negroes in grade two during Phase O and desegregated and segregated whites in grade two during Phase I. In both of these cases the mean achievement of the desegregated students was higher. Baltzell commented that desegregation during the first two years did not appear to have had any immediate effect on the achievement of either Negro or white students.[1]

Armor, in an examination of the effects of busing for the purpose of racial integration on achievement, sought to test an integration model which he developed from a synthesis of desegregation court decisions and the sociological studies that had supported those decisions. Armor limited his examination of how well integration programs met the integration model's prediction of an improvement in Negro achievement after integration to those that involved busing. Armor's choice to focus on integration via busing was made with the qualification that the integration experience itself might be difficult to separate

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[1]Ibid., pp. 14-15.

from possible effects of busing, which has nonetheless been a common component in the integration plans in many communities. Armor used two criteria in selecting studies that had dealt with the effects of integration via busing on achievement:

1. Studies must have measured actual changes in achievement in a longitudinal research design that used the same tests for achievement at two different times during the integration process.

2. A control group must have been used for comparison of the achievement of integrated Negro students.[1]

Armor described the ideal control group as a group of Negro students not bused but identical to those who were bused in all other ways. Armor added that a group of white students in the same schools where Negroes have been bused for racial integration could have been used as a control group where the effects of integration on achievement were measured as changes in the Negro/white achievement differences present before integration. Boston's Metropolitan Council For Educational Opportunity (METCO) in which 1,500 Negro students from the inner city were bused to twenty eight suburban community schools that were predominantly white was one of several integration programs in Armor's analysis that met these criteria.[2] All of the other studies selected by Armor have been reviewed elsewhere in this chapter.

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[1]David J. Armor, "The Evidence on Busing," The Public Interest, Summer 1972, pp. 90-126.

[2]Ibid.

All students in the METCO program were tested in October 1968 and again in May 1969. A control group of the siblings of the bused students matched on sex and grade level was established. Since these students were from the same families as the bused students, a control for social class and family factors could be assumed. After one year of the METCO program bused elementary Negro students showed grade level equivalent gains in reading one month greater, but not significantly greater, than the control group. In grades five and six the control group made grade level equivalent gains two months greater than the bused students; however, the differences between the experimental and control groups were not significant statistically. At the junior high school level the bused students made greater, but not significantly greater, gains than the control group, while at the senior high school level the reverse was observed.[1]

A 1969 Ann Arbor, Michigan, study which compared gains of bused Negro elementary students to those of whites and those of Negroes in a school with a fifty percent Negro population showed that bused Negro students did not make significantly greater gains than the Negro control group nor was the Negro/white achievement gap present before integration reduced.[2]

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[1] Ibid.

[2] U.S., Department of Health, Education, and Welfare, Office of Education, School Desegregation via Compulsory Pupil Transfer: Early Effects on Elementary School Children, by Patricia M. Carrigan, Final Report for Project No. 6-1320, Office of Education Contract No. 3-6-061320-0659, 1969, cited by David J. Armor, "Evidence on Busing," pp. 90-126.

Summers and Wolfe in a 1970-1972 study for the research department of the Federal Reserve Bank of Philadelphia sampled 627 students in 103 elementary schools between the end of the third and the sixth grades, 553 students in 42 schools between the end of the sixth and eight grades, and 716 students in five senior high schools between the ninth and twelfth grades in a comprehensive attempt to determine which factors most accounted for growth in achievement. Summers and Wolfe concluded that in elementary school, when other school factors were controlled, Negro and white students appeared to show the largest achievement growth in schools with a 40 to 60 percent Negro student body compared to that of Negro and white students in schools almost racially segregated. Negro and white students showed a slight positive effect on achievement from attending a junior high school that was up to 50 percent Negro. Negro students at the junior high level showed even greater growth, when they attended schools with even greater percentage Negro. White junior high students showed declines in learning or achievement growth, when they attended schools more than 50 percent Negro. At the senior high level racial composition of the student body did not appear to influence achievement at all.[1]

The findings and conclusions of Summers and Wolfe about the effect of integration or racial balance on achievement are really extraordinary, since their study may be the only study that has concluded that as the percentage Negro in the student

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[1]Federal Reserve Bank of Philadelphia, "Which School Resources Help Learning? Efficiency and Equity in Philadelphia Public Schools," by Anita A. Summers and Barbara L. Wolfe, Prepublication copy, Business Review, February 1975, pp. 1-4.

body increased, the achievement of Negro and white students also increased. In summarizing percentage of Negro pupils as a factor in achievement Summers and Wolfe stated:

> As all pupils go from a less than 20% Black school to a 20-40% Black school, achievement growth increases by 3.3 months. Similarly, going from a less than 20% Black school to a 40-60% Black school means a 5.6 month increase in achievement growth or an additional growth of 2.6 months over 20-40% Black schools. Going from a less than 20% Black school to a 60% or more Black school means an increase in achievement growth of 4.3 months or 1.3 months less than a 40-60% Black school.[1]

Summers and Wolfe used multiple regression techniques to explain the effect of independent variables such as socio-economic, school resource, and school climate factors on academic growth, the dependent variable. It would appear that Summers and Wolfe did not, however, account for the amount of variance in achievement that could be attributed to the social class of students, since this factor was not explained as were others such as class size, school size, percentage of Negro pupils, etc.

Summary

A review of the literature concerning the possible relationship, if any, between the racial composition of the student body and achievement has shown that no clear relationship has been shown. Early studies that used averages of student populations that had not been partitioned into Negro and white achievement scores concluded that integrated populations had shown no decline in achievement and had perhaps benefited from integration. The data and research designs used in these studies could not support such a conclusion. Cross-sectional studies

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[1] Ibid., app., pp. 2-3.

such as the "Coleman Report" were hampered by the selection problem in the sample of Negro students in integrated schools as well as the difficulty of separating race and socioeconomic class as factors in achievement. Cross-sectional studies were also troubled by the lack of a control group, since by their nature no experimental group was identified. Four-celled studies with a control group seemed to show no effect of racial composition of the student body on achievement, when socioeconomic class of the student was entered into the analysis. It would seem that the concept that racial integration of the schools would increase Negro achievement has been a sociological theory that became a legal and political reality which could not be supported by empirical research.

CHAPTER III

METHODS AND PROCEDURES

The methods and procedures used in this study were developed in the following order:

1. Research hypotheses
2. Factorial design
3. Statistical hypotheses
4. Level of statistical significance
5. Measure of achievement
6. Sampling procedure
7. Collection of data
8. Treatment of data
    a) Data set
    b) Statistical analyses
        (1) Condescriptive analysis
        (2) Analyses of variance
        (3) Analyses of covariance

Research Hypotheses

The research question to be answered in this study was to determine the relationship of racial integration to the reading achievement of white and black elementary students in grades two, three, and five in Alexandria, Virginia, City Public Schools during 1973-1974, the first year of de facto integration of its elementary schools through a plan for busing and pairing.

In order to determine the presence or absence of an effect of racial integration on the reading achievement of black and white elementary students in Alexandria during 1973-1974, it was hypothesized that the difference between the means of reading achievement for black and white elementary students in the sample measured before integration would be equal in the absence of an effect, and unequal in the presence of an effect, to the difference between the means of the reading achievement of these same students after integration.

Null Hypothesis

The difference between the means of reading achievement for black and white elementary students in the sample measured before integration was equal to the difference between the means of the reading achievement of these same students after integration.

Alternative Hypothesis

The difference between the means of reading achievement for black and white elementary students in the sample measured before integration was not equal to the difference between the means of the reading achievement of these same students measured after integration.

Equivalent Null Hypothesis

The gains (postmeasures less premeasures) for black and white elementary students in the sample were equal.

Equivalent Alternative Hypothesis

The gains (postmeasures less premeasures) for black and white elementary students in the sample were not equal.

Factorial Design

The factorial research design used in this study is illustrated in Fig. 1.

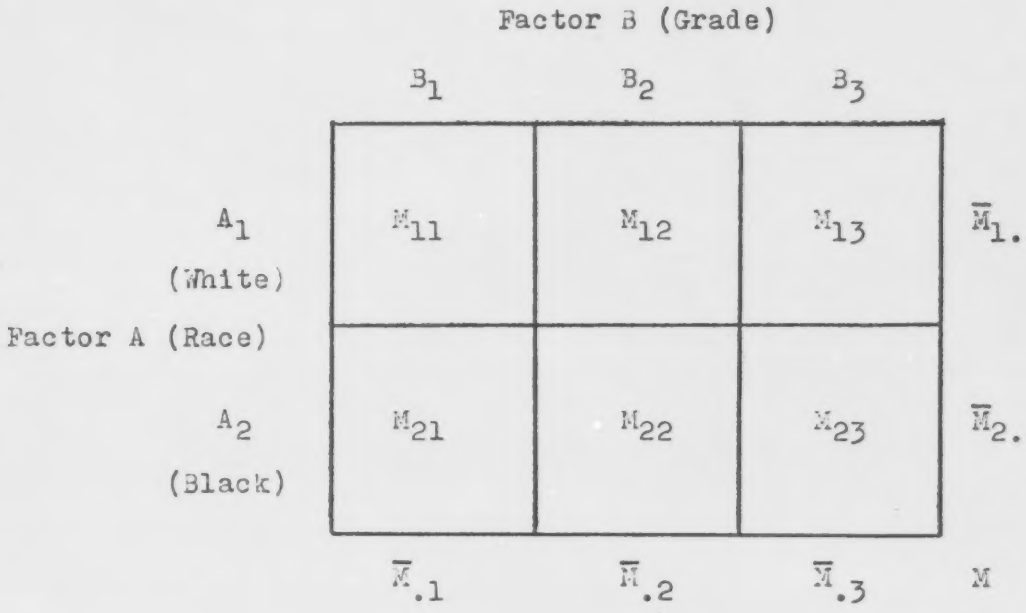

Fig. 1. Diagram of 2 X 3 two-factor ANOVA design for mean gains where i = 1,2 for race, j = 1,2,3 for grades two, three, and five, and M = mean gain.

Statistical Hypotheses

In the two-factor analysis of variance (ANOVA) used in this study for gains, factor A, race, had two levels, white and black, and factor B, grade, had three levels, grade two, grade three, and grade five. Factors A and B were considered main effects in the ANOVA of gains by grade and race, and

factor A X B two-way interactions by grade and race.

Factor A (Race)

Null Hypothesis:

There is no difference in gains by race.

$H_o: \bar{M}_{1.} = \bar{M}_{2.}$

Alternative Hypothesis:

There is a difference in gains by race.

$H_1: \bar{M}_{1.} \neq \bar{M}_{2.}$

Factor B (Grade)

Null Hypothesis:

There is no difference in gains by grade.

$H_o: \bar{M}_{.1} = \bar{M}_{.2} = \bar{M}_{.3}$

Alternative Hypothesis:

There is a difference in gains by grade.

$H_1: \bar{M}_{.1} \neq \bar{M}_{.2} \neq \bar{M}_{.3}$

Factor A X B

Null Hypothesis:

There is no interaction between factor A (race) and factor B (grade).

H_o: all $(M_{ij} - \bar{M}_{i.} - \bar{M}_{.j} + M) = 0$

Alternative Hypothesis:

There is interaction between factor A (race) and factor B (grade) in at least one M_{ij} cell.

$H_1: M_{ij} - \bar{M}_{i.} - \bar{M}_{.j} + M \neq 0$ for at least one M_{ij}

Level of Statistical Significance

The .01 level of statistical significance was chosen for this study as the basis of accepting or rejecting hypotheses.

Measure of Achievement

The reading subject area of the Science Research Associates (SRA) Achievement Series, a standardized test series, was selected as the measure of achievement for comparison in this study for the following reasons:

1. The SRA Achievement Series was administered yearly to all elementary students in Alexandria City Public Schools and the results were available for individual students.

2. The SRA Achievement Series provided separate measures for curricular areas such as reading, language arts, mathematics, social studies, science, and use of sources.

3. The SRA Achievement Series, a norm-referenced test, also provided a numeric scale, called growth scale values, for each subject area which measured achievement continuously regardless of periodic standardizations.

Growth Scale Values

The measure of achievement used in previous studies of the effects of integration on achivement has been the grade level equivalent expressed in scores that represented the year and month in school of students in the national norm whose median raw score was the same as that of a given student. For example, a grade level equivalent score of 3.7 in reading would indicate that a particular student's raw score in reading was equivalent to the median raw score of students nationally who had taken

that standardized test and had been in school three years and seven months.

Grade level equivalents were known to be limited in comparing year-to-year achievement levels of students, since they changed with each new standardization and were based on separate samples for each grade tested. To avoid these limitations SRA developed growth scales for each subject area. These scales were numeric and did not change with new standardizations. Each point on the growth scale was called a growth scale value with a range from 0 to approximately 850 in reading from grades one through twelve. In reading students on the average progressed fifty growth scale values per year in grades one through three and twenty to thirty growth scale values per year during later grades through grade twelve.[1]

Sampling Procedures

A random sample of one hundred white and one hundred black elementary students at each of grade levels one, two, and four in Alexandria, Virginia, City Public Schools as of March 1973, was obtained by the following procedures:

1. A random number was selected from a random numbers table.

2. The computer which maintains attendance and enrollment data on all Alexandria students was instructed to sort 150 white and 150 black students at grade levels one, two, and

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[1] Science Research Associates, Using Test Results: A Teachers' Guide (Chicago: Science Research Associates, 1972), pp. 10-11.

four beginning with those whose student number ended with the randomly chosen number.

3. A computerized September 1973 membership list of all elementary students in Alexandria City Public Schools by grade and race excluding students not classified as white (01) or black (02) was obtained.

4. At each grade level and in each racial category the sample was stratified and distributed over thirteen of the fifteen elementary schools in Alexandria to insure that all schools were represented.

5. Two elementary schools, however, were not included in the sample by design, since their racial percentages in November 1972, before integration by pairing and busing, indicated that they were substantially integrated as Table 2 shows. The trainable center was also excluded from the sample, since it is a special education facility where standardized achievement tests are not normally given.

6. The first one hundred students which appeared on the September 1973 membership list were selected, if they were still enrolled in Alexandria City Public Schools as of February 1, 1974. This same procedure was followed for each grade and race. If a student was no longer enrolled, the next student on the list was selected. Alexandria is a highly transient area and there was no reason to believe that students who left the area were significantly different from those that remained.

TABLE 2.--Membership by racial percentages, elementary schools, Alexandria City Public Schools, November 30, 1972

School	Membership	Race					
		Caucasian		Negro		Other	
		No.	%	No.	%	No.	%
Charles Barrett	365	329	90	11	3	25	7
Theodore Ficklin	326	45	14	280	86	. . . . .	
Patrick Henry	782	631	81	110	14	41	5
Stonewall Jackson	554	331	60	209	38	14	3
Jefferson-Houston	394	34	4	355	96	5	1
Cora Kelly	612	90	15	517	84	5	1
Robert E. Lee	323	45	14	275	85	3	1
Lyles-Crouch	387	92	24	293	76	2	1
Douglas MacArthur	504	430	85	50	10	24	5
George Mason	464	442	96	14	3	8	2
Maury	457	416	91	35	8	6	1
Mount Vernon	1,086	721	66	327	30	38	4
James K. Polk	589	549	93	16	3	24	4
William Ramsay	739	696	88	29	4	64	8
Trainable Center	54	24	44	30	56	. . . . .	
John Tyler	674	595	88	26	4	53	8
Total	8,860	5,470	62	3,077	35	313	4

NOTE: Due to rounding percentages may not total 100 per cent.

Collection of Data

A March 1973 and a March 1974 SRA reading achievement growth scale value was obtained for 518 of 600 students in the sample from an elementary population of 8,360 less 1,640 students from the two schools excluded from the study, 313 students not classified as black or white, and 54 students from the trainable center, leaving a total population of 6,353 on which the sample was based. In this manner 518 pairs of complete prescores and postscores were produced. Students for which only a prescore or a postscore were available were dropped from the sample. See Table 3 for complete 1973 membership by school.

Treatment of Data

In order to prepare the data for computerized analysis it was necessary to reduce the data to a quantitative descriptor for each observation. Schools in Alexandria had already been assigned computer code numbers. Race was identified as 01 for white and 02 for black. Each student was assigned a consecutive identifying number at each grade level in each school. For example, a white, second-grade student at Maury school with a prescore reading growth scale value of 34 and a postscore of 149 who was first in the grade/school sample was described quantitatively by the following digits:

GRADE	RACE	SCHOOL	STUDENT	PRESCORE	POSTSCORE	GAIN/LOSS
01	01	06	01	84	149	65

Data Set

Using the descriptor shown above for each observation

TABLE 3.--Membership by racial percentages, elementary schools, Alexandria City Public Schools, November 30, 1973

School	Membership	Race					
		Caucasian		Negro		Other	
		No.	%	No.	%	No.	%
Charles Barrett	463	316	68	120	26	27	6
Patrick Henry	745	388	52	300	40	57	8
Stonewall Jackson	666	366	55	274	41	26	4
Jefferson-Houston	607	297	50	239	43	21	4
Cora Kelly	539	192	33	365	62	32	5
Robert E. Lee	239	118	49	114	43	7	3
Lyles-Crouch	361	175	49	182	50	4	1
Douglas MacArthur	432	232	54	170	39	30	7
George Mason	537	372	69	157	29	8	2
Maury	404	260	64	142	35	2	1
Mount Vernon	1,114	689	62	390	35	35	3
James K. Polk	622	364	59	224	36	34	6
William Ramsay	724	430	59	245	34	49	7
Trainable Center	57	29	51	27	47	1	2
John Tyler	593	290	49	248	42	55	9
Total	8,153	4,513	55	3,247	40	388	5

NOTE: Due to rounding percentages may not total 100 per cent.

or student in the sample, a data set of 513 observations was constructed on punched cards. The data set was then given the following statistical treatments using computerized programs indicated:

Condescriptive Analysis

The Statistical Package for the Social Sciences SPSSH, Version 6.00 was used to provide a description of the data and check the calculation of gains/losses for accuracy.

Analysis of Variance

The Statistical Package for the Social Sciences SPSSH, Version 6.00 was used to provide an analysis of variance by grade and race for (1) prescore, (2) postscore, and (3) gain.

Analysis of Covariance

The BMD04V, Analysis of Covariance - Multiple Covariates Program (revised October 2, 1972, Health Sciences Computing Facility, UCLA) was used for an analysis of covariance with prescore as the covariate for grades two, three, and five.

CHAPTER IV

FINDINGS

Analysis of Variance

Factor A (Race)

An analysis of variance of gains by grade and race (see Table 4) showed that the null hypothesis for factor A (race), that there was no difference in gains by race, could be rejected at the 0.001 level of probability. Race, therefore, was a significant factor in achievement differences in reading for black and white students in grades two, three, and five in Alexandria, Virginia, City Public Schools during the period of investigation (1973-1974). As Table 5 shows, whites made mean gains of 56.124 at grade two, 38.464 at grade three, and 34.093 at grade five. Blacks made mean gains of 46.101 at grade two, 27.940 at grade three, and 17.183 at grade five. This finding of a significant black/white achievement difference at each grade level sampled, while not surprising, had to be proven, nonetheless.

Factor B (Grade)

An analysis of variance of gains by grade and race showed (see Table 4) that the null hypothesis for factor B (grade), that there was no difference in gains by grade, could be rejected at the 0.001 level of probability. Grade was a significant factor in reading achievement differences among students in grades two, three, and five in Alexandria City Public Schools during 1973-1974.

Table 4.--Analysis of Variance, Gain by Grade and Race

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Main Effects	81,051.750	3	27,017.250	15.845	0.001
Grade	56,119.961	2	28,059.930	16.456	0.001
Race	20,333.641	1	20,333.641	11.954	0.001
Two-Way Interactions	1,282.500	2	641.250	0.376	0.999
Grade/Race	1,232.484	2	641.242	0.376	0.999
Residual	873,023.562	512	1,705.124		
Total	955,357.812	517	1,847.387		

Table 5.--Description of Subpopulations, Gain by Race and Grade

	Sum	Mean	Standard Deviation	Variance	N
Entire Population	13,784.00	36.2625	42.9874	1,847.9155	518
		White			
Grade Two	4,995.00	56.124	42.970	1,846.429	89
Grade Three	3,731.00	38.464	31.232	975.413	97
Grade Five	2,932.00	34.093	34.934	1,220.363	86
Total	11,658.00	42.860	37.643	1,416.969	272
		Black			
Grade Two	3,181.00	46.101	51.681	2,670.888	69
Grade Three	2,347.00	27.940	41.472	1,719.937	84
Grade Five	1,593.00	17.183	45.302	2,052.233	93
Total	7,126.00	28.967	47.227	2,230.375	246

This finding was predictable, since the measure of reading achievement used in this study, the SRA growth scale value for reading, is based on a numeric scale where students normally make gains for each year in school. As Table 5 shows, mean gains for both black and white students were greater at the lower grade levels and leveled off at the higher grade levels.

Factor A X B (Race/Grade)

An analysis of variance of gains by grade and race showed that the null hypothesis for factor A X B (race/grade), that there was no interaction between factors A and B, with a level of significance for F of 0.999, did not permit the rejection of the factor A X B null hypothesis. It was concluded that there was no finding of interaction between race and grade.

Analysis of Covariance

An analysis of covariance was performed to determine if initial differences between black and white prescores could have accounted for black and white differences in postscores. Prescores represented a segregated condition, while postscores represented an integrated one. With prescores as the covariate for grades two, three, and five, after adjusting with covariates (see Appendix, Table 14), race remained a significant factor in accounting for differences in gains at all three grade levels.

Research Hypothesis

The null hypothesis that the difference between the means of reading achievement for black and white students in grades two, three, and five in Alexandria, Virginia, City Public Schools

measured before integration was equal to the difference between the means of reading achievement of these same students measured after integration could be rejected, since the gains for black and white students were not equal. As Table 6 shows, this black/white achievement difference in reading for grades two, three, and five actually increased after integration of Alexandria's elementary schools on a wide scale in 1973.

Trends in the Data

An examination of the prescores which represented grades one, two, and four (see Table 6) revealed that there were differences in the mean reading growth scale values for black and white students in all of the grades sampled. At grade one the black/white difference of 40.939 represented 81.873 percent of the mean annual gain of 50.0 growth scale values in reading, normally expected of students during the primary grades of one, two, and three. At grade two the difference for these same black and white students had increased to 50.962--slightly more than the normal growth rate for this grade level. In examining mean gains for grade two, calculated as grade two postscore less grade one prescore, however, the mean gain in reading achievement for black second graders was 46.101 growth scale values compared to 56.124 for white second graders. In terms of progress in reading growth whites achieved slightly above the national average at grade two, while blacks achieved slightly below.

At grade two, represented by prescore for grade three, the black/white difference in reading growth scale values was 37.569 or 75.138 percent of the normal annual growth of 50.0 for the primary grades. At grade three this difference had grown to

Table 6.--Description of Subpopulations, Black/White Mean Differences by Grade, Race, Prescore, Postscore

	Prescore			Postscore			
Grade	White	Black	Difference	White	Black	Difference	Mean Difference
Two	157.809	116.870	40.939	213.933	162.971	50.962	10.023
Three	216.021	178.452	37.569	254.485	206.393	51.092	13.523
Five	235.026	223.151	61.875	319.360	240.333	79.527	17.652
Total	219.026	178.077	40.949	261.886	207.045	54.841	13.892

51.092--slightly more than one year's normal growth in reading. The mean gain for black students (see Table 5) at grade three was 27.940 or only 55.880 percent of the norm of 50.0, while that for whites at this grade level was 38.464 or 76.923 percent of the norm of 50.0. At grade three both black and white students in Alexandria made progress in reading, as measured by reading growth scale values, that was below the national norm of 50.0 for this level.

At grade four, shown by prescore for grade five, the black/white difference in reading growth scale values (see Table 6) was 61.875--two to three years' growth, since the normal growth in reading on this measure for the intermediate grades is 20.0 to 30.0 growth scale values per year. At grade five this black/white difference had grown to 79.527. The gain for white fifth graders (see Table 5) was 34.093 reading growth scale values in reading and 17.133 for blacks. At grade five whites had made gains in reading slightly above the upper norm level of 30.0, while blacks had performed slightly below the lower norm level of 20.0.

Figures 2, 3, and 4 graphically show the reading progress of Alexandria elementary students in grades two, three, and five as measured by the SRA reading growth scale values. The dotted line represents the point on the scale (postscore) that would have been reached by black students had the initial black/white difference in reading means of prescores (which represented a segregated condition) at each grade level been maintained after integration.

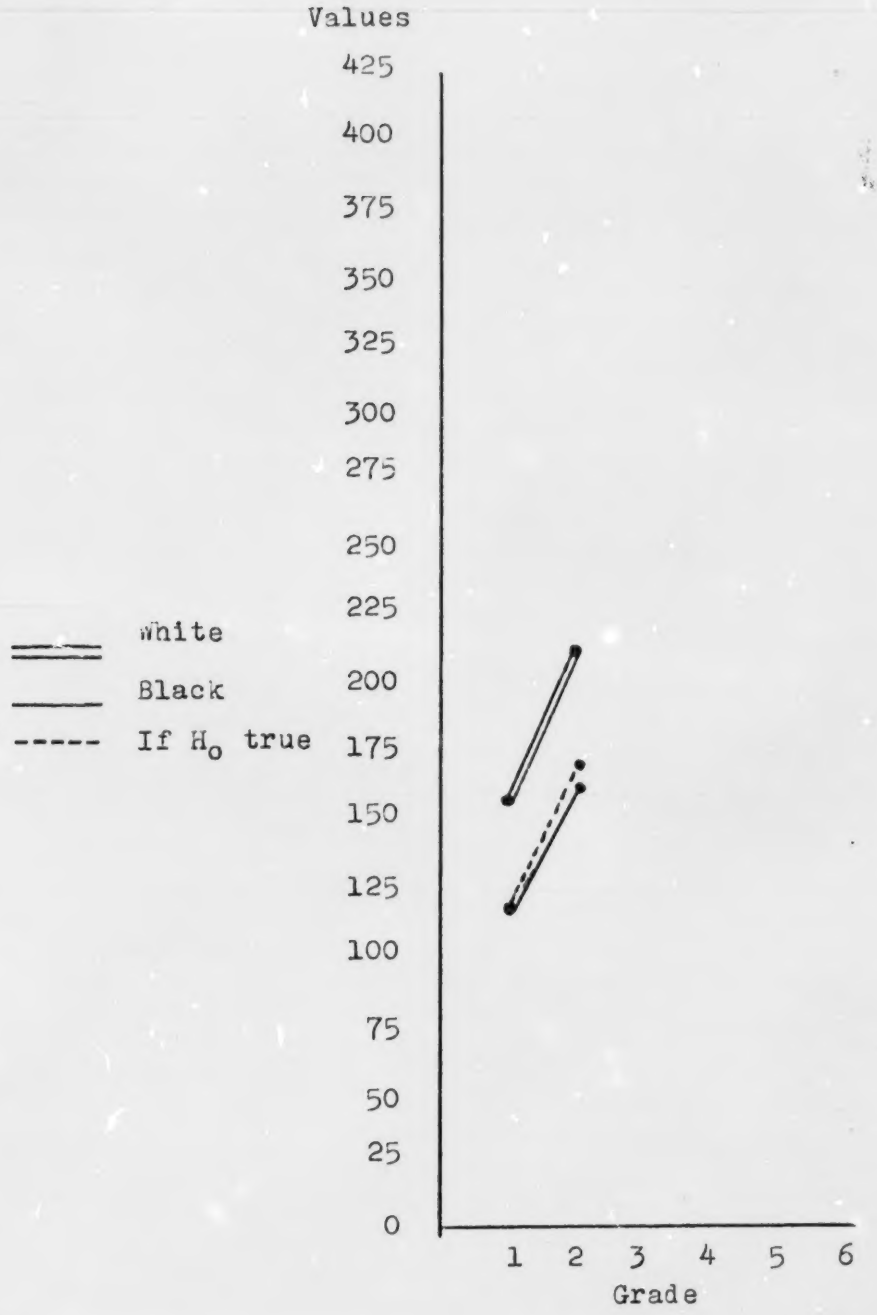

Fig. 2. Graph of reading growth scale values for grade one/two by race, prescore, postscore.

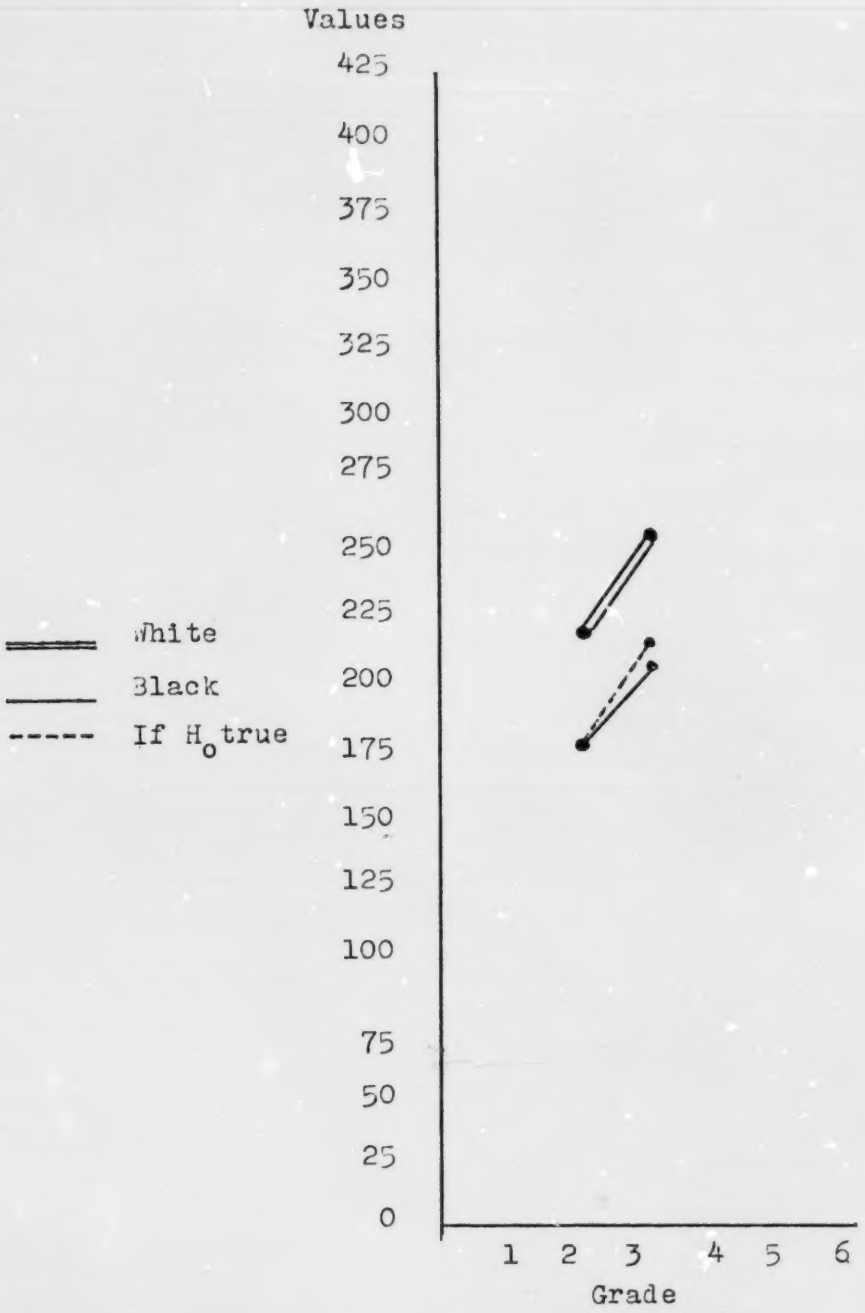

Fig. 3. Graph of reading growth scale values for grade two/three by race, prescore, postscore.

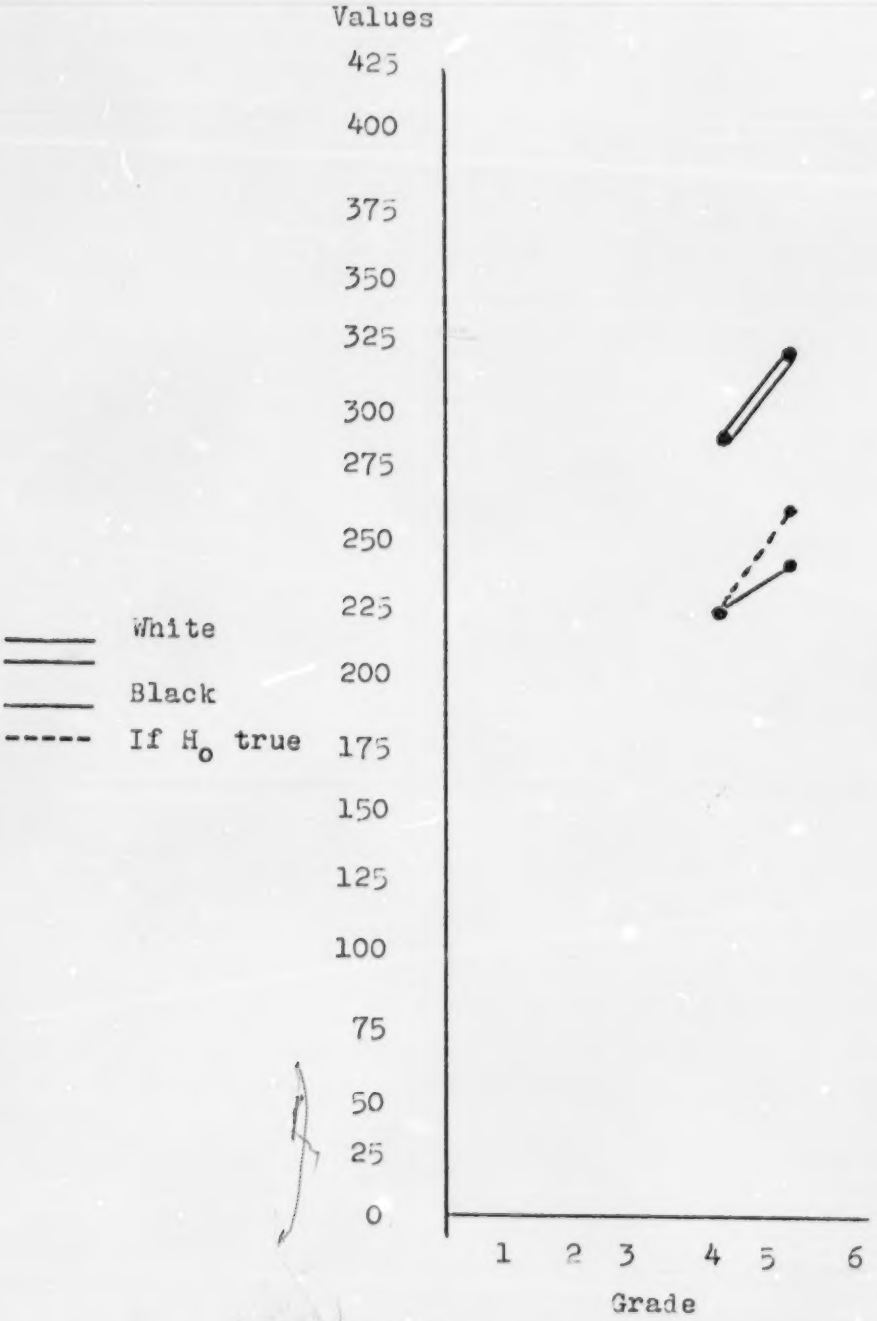

Fig. 4. Graph of reading growth scale values for grade four/five by race, prescore, postscore.

At grade two (see Figure 2) the reading growth scale lines were both upward with blacks falling only slightly farther behind whites. At grade three (see Figure 3) while the distance between black and white achievement in reading had increased, the decline in reading progress for blacks in comparison to whites was not pronounced, since the reading progress of whites at this grade level had also leveled off and was below the national norm. At grade five (see Figure 4) not only had the magnitude of the black and white achievement difference in reading progress increased, but the black growth in reading had fallen even farther behind whites in comparison with this difference in the same students at grade four.

In terms of the possible effect of integration on the reading achievement of black and white students in grades two, three, and five during the first year of wide scale integration of Alexandria's elementary schools, it would appear that integration did not have an effect of reducing the black/white achievement difference in reading present prior to integration.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study has attempted to determine the relationship of racial integration to reading achievement of black and white elementary students in grades two, three, and five of Alexandria, Virginia, City Public Schools during 1973-1974, the first year of racial integration of Alexandria elementary schools on a wide scale by busing and pairing. A comparison was made between the mean reading achievement of a randomly selected sample of black and white students in grades one, two, and four in thirteen of fifteen Alexandria elementary schools whose racial compositions were significantly different from the 1972 total elementary school racial composition of 64 percent white, 34 percent black, and 3 percent other and these same students one year later in grades two, three, and five in schools then integrated with an average racial composition of 55 percent white, 40 percent black, and 5 percent other.

The research hypothesis was that the difference between reading achievement means of black and white students in the sample measured before integration would be equal to the difference between reading achievement means of these same students measured after integration in the absence of an effect and unequal in the presence of an effect. An equivalent way of stating this was

that the gains (postmeasures less premeasures) for black and white elementary students in the sample were equal.

An analysis of variance of the gain scores for black and white Alexandria elementary students in the sample showed that the difference between the means of reading achievement for black and white elementary students measured before integration were not equal to the difference between the means of the reading achievement of these same students measured after integration. The difference between black and white achievement in reading had widened after integration with blacks falling farther behind whites in comparison to the black/white achievement difference in reading before integration. An analysis of covariance was performed at grades two, three, and five using prescore as the covariate to determine whether or not initial differences could have accounted for the finding that the black/white achievement gap in reading increased after integration. The analysis of covariance at all three grade levels in the sample failed to show that race was not a significant factor in achievement differences after integration, when initial black/white achievement differences in reading were controlled statistically.

Conclusions

On the basis of the review of the literature on the relationship between racial integration and reading achievement, the following tentative conclusions have been reached:

1. Coleman's finding that the achievement of black and white students increased as the proportion white in a school increased, was not supported by the present study.

2. Socioeconomic class as a factor in student achievement may be confounded with race to such an extent that for the present these factors can not be separated adequately for analysis.

3. As research designs became more adequate, the finding that reading achievement gains could be attributed to integration, which was characteristic of many earlier studies on the effect of racial integration on reading achievement, became less common. The more sophisticated four-cell studies with a control group found only slight or no relationship between racial integration and reading achievement.

The following conclusions have been reached on the basis of findings in the present study:

1. Prior to the implementation of the 1973 plan for reorganization of Alexandria's elementary schools for the purpose of racial integration, there were achievement differences in reading for black and white students with whites achieving higher than blacks in grades one, two, and four which were sampled. The magnitude of the black/white achievement differences in reading increased at the higher grade levels.

2. After the integration of Alexandria's elementary schools in 1973 on a wide scale by busing and pairing, the difference between black and white reading achievement not only had not decreased but had actually increased with blacks falling farther behind whites.

3. While it is not possible on the basis of the present study to state that the integration of Alexandria elementary schools in 1973 was responsible for the increase in the black/white reading achievement differences with blacks continuing to

fall farther behind whites, it can be said that integration did not appear to have provided an observable and significant improvement in black reading achievement in comparison with white.

4. Although the findings indicated that integration did not prevent the increase in black/white achievement differences in reading, it can not be concluded on the basis of these findings that these differences might not have been normal to the population sampled. If this were the case, one could then compare the rate of black/white achievement difference increase to that seen prior to integration. Unfortunately no such data exist, since reading achievement, as well as other curriculum areas, had not been partitioned by race in Alexandria prior to the present study.

Policy Recommendations

On the basis of the findings of the present study and others reviewed in this study, it is recommended that no further plans to alter the racial composition of the elementary schools of the City of Alexandria, Virginia, be implemented unless and until it can be determined that such changes have a positive relationship to achievement.

Recommendations for Further Research

The present study has raised several questions that require further investigation. The following recommendations are made for further study:

1. A study of the black/white achievement differences in reading and other curriculum areas for Alexandria City Public Schools should be done to provide data for comparing the relative

black and white achievement levels and differences before and after integration. This would require partition of all achievement test scores by race.

2. Further research on the relationship between racial integration of schools and achievement for black and white students should be performed at local, state, and national levels to determine if there is a relationship between racial composition and achievement of black and white students.

3. Research on the relationship between racial composition of schools and achievement should continue to be performed to assist schools in developing policies on racial composition of schools that could be supported by empirical evidence with the goal of providing equality of educational opportunity to all Americans.

APPENDIX

Table 7.--Description of Subpopulations, Prescore by Race and Grade

	Sum	Mean	Standard Deviation	Variance	N
Entire Population	103,382.00	199.5791	73.5675	5,412.1758	518
		White			
Grade One	14,045.00	157.809	48.701	2,371.750	89
Grade Two	20,954.00	216.021	53.373	2,902.323	97
Grade Four	24,576.00	285.767	70.684	4,996.211	86
Total	59,575.00	219.026	77.543	6,012.906	272
		Black			
Grade One	8,064.00	116.870	39.977	1,593.146	69
Grade Two	14,990.00	178.452	41.935	1,753.566	84
Grade Four	20,753.00	223.151	52.121	2,716.619	93
Total	43,807.00	178.077	62.336	3,835.775	246

Table 8.--Description of Subpopulations, Postscore by Race and Grade

	Sum	Mean	Standard Deviation	Variance	N
Entire Population	122,166.00	235.8417	71.9632	5,178.7070	518
		White			
Grade Two	19,040.00	213.933	55.737	3,106.636	89
Grade Three	24,635.00	254.484	55.242	3,051.677	97
Grade Five	27,503.00	319.360	58.759	3,452.612	86
Total	71,233.00	261.886	70.811	5,014.199	272
		Black			
Grade Two	11,245.00	162.971	54.462	2,966.073	69
Grade Three	17,337.00	206.393	47.569	2,262.831	84
Grade Five	22,351.00	240.333	57.431	3,298.359	93
Total	50,933.00	207.045	61.614	3,796.241	246

Table 9.--Analysis of Variance, Prescore by Grade and Race

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Main Effects	1,365,217.000	3	455,072.312	164.494	0.001
Grade	1,148,622.000	2	574,311.000	207.595	0.001
Race	287,549.437	1	287,549.437	103.940	0.001
Two-Way Interactions	16,319.000	2	8,159.500	2.949	0.052
Grade/Race	16,318.562	2	8,159.281	2.949	0.052
Residual	1,416,447.000	512	2,766.498		
Total	2,797,983.000	517	5,411.957		

Table 10.--Analysis of Variance, Postscore by Grade and Race

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Main Effects	1,098,051.000	3	366,017.000	120.697	0.001
Grade	709,553.375	2	354,776.687	116.991	0.001
Race	461,051.375	1	461,051.375	152.036	0.001
Two-Way Interactions	26,595.000	2	13,297.500	4.385	0.013
Grade/Race	26,594.906	2	13,297.453	4.385	0.013
Residual	1,552,652.000	512	3,032.523		
Total	2,677,298.000	517	5,178.523		

Table 11.--Analysis of Covariance, Postscore, Grade Two, Using Prescore, Grade One, As Covariate

Source	df	YY	Sum-Squares (Due)	Sum-Squares (About)	df	Mean-Square
Treatment (Between)	1	100,940.0				
Error (Within)	156	475,077.0	158,343.1	316,733.8	155	2,043.4
Treatment Plus Error (Total)	157	576,017.0	243,614.5	332,402.5	156	
Difference for Testing Adjusted Treatment Means			15,668.6		1	15,668.6

Null Hypothesis: No difference among treatments after adjusting with covariates.

F (1, 155) = 7.668

Table 12.--Analysis of Covariance, Postscore, Grade Three, Using Prescore, Grade Two, As Covariate

Source	df	YY	Sum-Squares (Due)	Sum-Squares (About)	df	Mean-Square
Treatment (Between)	1	104,111.0				
Error (Within)	179	480,779.0	263,504.7	217,274.2	173	1,220.6
Treatment Plus Error (Total)	180	584,890.0	354,221.1	230,668.8	179	
Difference for Testing Adjusted Treatment Means			13,394.6		1	13,394.6

Null Hypothesis: No difference among treatments after adjusting with covariates.

F (1, 178) = 10.973

Table 13.--Analysis of Covariance, Postscore, Grade Five, Using Prescore, Grade Four, As Covariate

Source	df	YY	Sum-Squares (Due)	Sum-Squares (About)	df	Mean-Square
Treatment (Between)	1	282,590.0				
Error (Within)	177	596,920.0	355,177.0	241,742.9	176	1,373.5
Treatment Plus Error (Total)	178	879,510.0	596,541.7	282,968.2	177	
Difference for Testing Adjusted Treatment Means				41,225.3	1	41,225.3

Null Hypothesis: No difference among treatments after adjusting with covariates.

F (1, 176) = 30.014

Table 14.--Adjusted Means and Standard Errors for Postscore, Grades Two, Three, and Five by Race, Using Prescore, Grades One, Two, and Four As Covariates

Treatment (Race)	Treatment Mean	Adjusted Mean	Standard Error Adjusted
	Grade Two		
White	213.9326	201.3044	5.0018
Black	162.9710	179.2594	5.7480
	Grade Three		
White	254.4845	240.7493	3.6685
Black	206.3929	222.2536	3.9619
	Grade Five		
White	319.8604	296.2544	4.2575
Black	240.3333	262.1621	4.0758

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